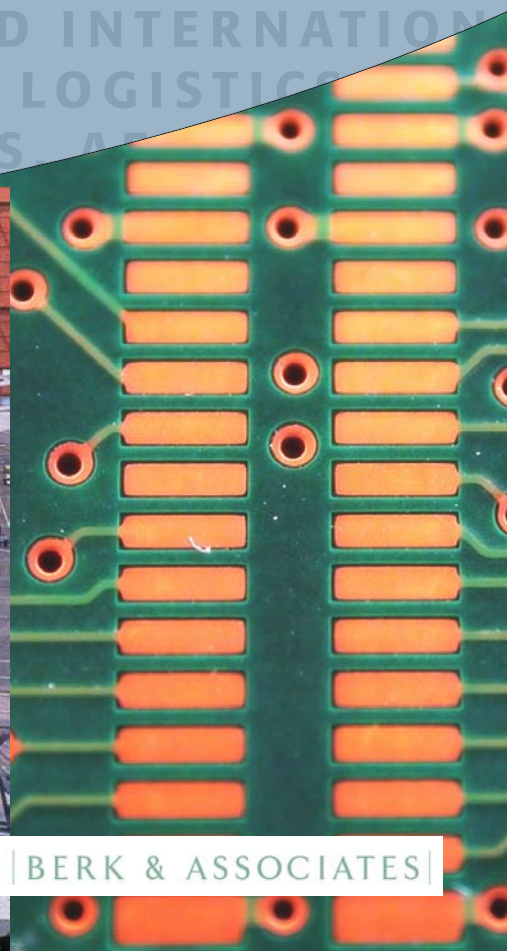




Washington State Innovation Zone Project Central Puget Sound Region Innovation Zones:

Policy Analysis and Proposal

September 2006



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WASHINGTON STATE INNOVATION ZONE PROJECT CENTRAL PUGET SOUND REGION INNOVATION ZONES: POLICY ANALYSIS AND PROPOSAL

EXECUTIVE SUMMARY

Introduction

In June 2006, the State awarded six Innovation Zone planning grants to regions across the State, including one to the Puget Sound region. The grants serve as pilot projects, to provide real-world information and guidance to the State in developing potential Innovation Zone policies and economic strategies. The Innovation Zone approach links economic development, workforce and investment strategies to help focus the State's resources and investment decisions, and to catalyze growth in promising areas. Three sponsoring agencies in the region – the Prosperity Partnership, the Seattle-King County Workforce Development Council, and enterpriseSeattle organized a Working Group to address questions posed by the grant, the answers to which are contained in this report.

Innovation Zone Definition and Policy Framework

The Working Group began by defining Innovation Zones and developing a policy framework for its implementation. Innovation Zones are defined as specific geographic areas where leading edge companies, major research institutions, highly skilled workers, and substantial public resources have concentrated to improve competitiveness and productivity. A vibrant Innovation Zone fosters random interaction between companies, researchers, and entrepreneurs that often leads to collaborative partnerships and innovation. Businesses and institutions in these Zones benefit from opportunities for collaboration, a large well-qualified labor pool, and branding as a great place to do business.

In the Puget Sound, the Prosperity Partnership has developed a Regional Economic Strategy based on the concept of supporting the region's strongest and most dynamic industry clusters. Clusters, as defined by the Prosperity Partnership, are similar to Innovation Zones. However, the Group determined that Innovation Zone policies could complement existing cluster-based policies. Innovation Zones could build upon and strengthen regional cluster strategies by focusing on sub-regional zones of dynamic economic activity, innovation, and growth potential. Essentially, Innovation Zones could be considered sub-regional economic clusters.

Organizing Principles to Guide Innovation Zone Policies. The group developed seven organizing principles to guide policy development for Innovation Zones:

1. **Cluster Maturity and Geographic Implications.** Innovation Zones can be mature or aspirational. The more established the cluster (and hence the higher the concentration of employment), the tighter the Innovation Zone can be drawn. The more emerging and evolving the cluster, the broader the geographic boundaries should be drawn.
2. **New Zones May Grow and Evolve.** Innovation Zones are not static. As industries and geographic areas grow, new Zones may emerge and be appropriately designated as

Innovation Zones. Zones should be revisited over time, to take into consideration industry growth and trends.

3. **Some Stakeholders May Prefer Broader Geographic Boundaries.** Creating a “Zone” will, by definition, include some jurisdictions and firms, and exclude others. Innovation Zone proposals should be discussed with affected stakeholders, and revisited over time, as the concept evolves and matures.
4. **Inter-Zone Collaboration, Overlap, and Connections Exist and Should be Encouraged.** Certain clusters may benefit from close proximity to each other, sparking collaboration and innovation between and among Innovation Zones. Regions should look for, assess and encourage inter-Zone connections and linkages.
5. **Innovation Zone Needs Are Not Limited to Zone Boundaries.** Some investments needed to support Innovation Zones can be made within the Zones, while others are regional in nature and cross industry and Zone boundaries.
6. **Innovation Can be Found in All Industries.** Innovation Zones should recognize innovation broadly and not be limited to high technology fields.
7. **Effective Selection, Appropriate Number and Scale of Innovation Zones.** Innovation Zone selection should be based on a set of rigorous and well-defined criteria. Criteria should be stringent enough so that there are not too many or too few Zones to be adequately supported by the State.

Selection Criteria for Innovation Zones. Criteria were identified for selection of specific Zones:

- **Employment and growth potential:** high employment concentrations within an industry; growing or expected to grow in near future; concentration of innovative or technologically advanced companies; has a network of supportive services, including distribution, legal, professional and technical services; has an anchor tenant or tenants with status and a solid reputation as a regional, national, or global leader in the industry.
- **Workforce needs and support:** has defined workforce needs and access to a qualified labor pool; has access to quality educational institutions, including K-12, community college, and higher education.
- **Infrastructure capacity:** has adequate land and facilities to accommodate industry needs and growth; is accessible to the labor force, by road, mass transit, rail, ferries; has at least some telecommunications coverage and service for access to the Internet and wireless communications; has some minimum amount of retail and amenities needed to support an employment base.
- **Investment capacity:** there is potential for the industries to leverage State investment with federal and private investments.

Puget Sound Innovation Zones

The Working Group applied the selection criteria to the five Prosperity Partnership Pilot Clusters and identified the following nine Innovation Zones in the Puget Sound region.

Information Technology Innovation Zones (2)

- E-Side: Redmond, Bellevue, Kirkland
- Seattle: Fremont, University District, Eastlake, Elliott/Mercer, Downtown, Pioneer Square, Beacon Hill

Life Sciences Innovation Zones (2)

- South Lake Union/Interbay/UW Corridor
- SE Snohomish/NE King: Bothell to Redmond

Aerospace Innovation Zones (2)

- South King County – South Seattle, Renton, Kent, Auburn
- Paine Field, Snohomish County

Logistics and Trade Innovation Zones (2)

- South Seattle, Port of Seattle, SeaTac, and South King County
- Port of Tacoma and surrounding area

Clean Technology Innovation Zone (1)

- Clean Technology is an emerging cluster with no clearly defined area of activity to focus on, so a region-wide emerging Innovation Zone is proposed for the Clean Technology industry.

Implementation of an Innovation Zone Policy

Two-tiered Approach. The Working Group developed a potential process the State could use to put an Innovation Zone policy into place. This process provides for a two-tiered system of Innovation Zones, acknowledging that there are both mature and emerging clusters of economic activity. Such a tiered system gives the State flexibility in the types of support it offers to different Innovation Zones. Emerging Zones could be eligible for marketing, branding, and technical assistance support geared towards building momentum around an area or industry with high growth and innovation potential. Mature Zones could be eligible for more direct infrastructure and workforce investment, since these investments are likely to be the ones most needed.

Application Process for Zone Designation. Rather than have Innovation Zones independently designated by State authorities, an application process is suggested. Local economic development agencies in cooperation with local workforce development agencies and industry groups could put together applications to the State supporting areas within their region for Innovation Zone designations. Applications could be submitted to the Governor's office or a designated agency for

review. The State could possibly provide technical assistance for applications for smaller industries and less well-developed clusters.

Re-evaluation and Updates of Innovation Zones. Because clustering activity is dynamic and changes over time, an Innovation Zone program should have the flexibility to adjust Zone boundaries, create new Zones as they emerge and mature, and remove Innovation Zone designations if particular industry clusters begin to decline. Innovation Zone designations should last a given amount of time before their status “sunset” and needs to be renewed. These durations should be longer for mature Innovation Zones and shorter for emerging Innovation Zones. There should also be regularly scheduled evaluations of the Zones to assess progress and make adjustments.

Industry-Specific Needs and Strategies

Part 2 of the report contains summary information on industries in the Puget Sound Innovation Zones, including an overview of industry growth and associated infrastructure, workforce and public policy needs to support that growth. Infrastructure needs identified across all Zones include transportation and mobility; broadband and wireless infrastructure and access; electrical power; and business space. Other needs that affect all Innovation Zones include support for technology commercialization and access to capital.

Chapter 5 of the report focuses on strategies to meet labor supply and skills needs, including a compendium of education issues and needs generally, and specific workforce development strategies for some of the Innovation Zone industries.

Chapter 6 contains public policy recommendations to promote growth, economic vitality and innovation in the Zones. These recommendations were synthesized from a number of sources, including existing and draft policy reports prepared by the participating organizations, current and proposed legislation to support workforce development and industry innovation, and the Working Group’s discussions. Major recommendations include supporting and streamlining legislation enacted in 2006 that funds customized workforce training for small businesses (SB 6326—the Shin bill); maintaining the R&D exemption on B&O tax payments; proving support for new legislation providing an apprentice employment incentive package; and encouragement to consider the return on investment to the State as well as the cost of tax incentives to growing industries.

WASHINGTON STATE INNOVATION ZONE PROJECT

CENTRAL PUGET SOUND REGION INNOVATION ZONES:

POLICY ANALYSIS AND PROPOSAL

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WASHINGTON STATE INNOVATION ZONE PROJECT

CENTRAL PUGET SOUND REGION INNOVATION ZONES:

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PART I: INNOVATION ZONE DEFINITION AND POLICY FRAMEWORK

I.0 INTRODUCTION: PROJECT OBJECTIVES AND APPROACH

1.1 Project Background

In June 2006, the State awarded six Innovation Zone planning grants to regions across the State. The grants are intended to serve as pilot projects, to provide real-world information and guidance to the State in developing a potential Innovation Zone economic strategy. The Innovation Zone approach would link economic development, workforce and investment strategies and help focus the State's resources and investment decisions to catalyze growth in promising areas.

The Puget Sound region's grant was awarded to the Seattle-King County Workforce Development Council (WDC), which served as contract administrator. In response to the grant award, three sponsoring agencies in the region – the Prosperity Partnership, the WDC and enterpriseSeattle organized a Working Group representing the region's economic development, workforce development, and technology transfer organizations, as well as relevant trade associations. The sponsors retained Berk & Associates to facilitate the group's work and write its report.

The Working Group met five times in July-August, each time addressing with greater depth the questions posed by the State grant, which included defining potential Zones, identification of resources needed to facilitate innovation within the Zones, and recommendations for technology, workforce and public policy actions the State could undertake to help the Zones grow.

1.2 Research and Analytical Approach: Dialogue and Synthesis

Early in its work, the group recognized the value of the Prosperity Partnership's extensive work on regional clusters, and used that work as a foundational base for the project. This foundation includes use of Prosperity Partnership's analytic information, use of the five major clusters that the Partnership identified (Aerospace, Life Sciences, Information Technology, Logistics and International Trade, and Clean Technology), and incorporation of policy recommendations from the Partnership's regional plan.

In addition to Prosperity Partnership materials, this report incorporates existing strategies and materials (including draft reports and works-in-progress) from diverse sources, including the Seattle-King County WDC, the Snohomish County Economic Development Council, the Washington Biotechnology and Biomedical Association (WBBA), and others. Where appropriate, key strategies and recommendations

are excerpted directly from the original document into this report. Report drafts were also generously reviewed by several subject matter experts,

Availability of Policy Recommendations and Strategies. A major theme of this report is the differential levels of maturity and public policy focus across the five major clusters and types of Innovation Zones. As reflected in this report, the region has spent considerable time and effort working on economic development and workforce strategies for the Aerospace, Life Sciences and Information Technology clusters – and less so for Logistics and International Trade and Clean Technology. The report’s content and industry-specific recommendations reflect this situation – there are more programs, recommendations and action strategies in some areas than others.

1.3 Report Organization

This report is organized into two parts and six chapters, based on the questions identified in the State’s grant solicitation, and the Working Group’s response to those questions. Part 1 (Chapters 1-3) focuses on Innovation Zone definition and a proposed policy framework. Part 2 (Chapters 4-6) contains industry-specific needs and strategies. Following this introductory chapter, the report contains the following information:

- Chapter 2 contains the policy analytic framework developed to discuss and select Innovation Zones in the region. The chapter first defines the Innovation Zone concept, then presents operating principles and criteria the group developed to guide its selection of specific Innovation Zones, and identifies potential criteria to measure innovation within the Zones over time.
- Chapter 3 describes the region’s five major clusters and their most significant subclusters, then presents the Working Group’s recommendations for Innovation Zones in the Puget Sound region, supported by cluster maps prepared by the Prosperity Partnership.
- Chapter 4 presents snapshot profiles of the industries in the Zones, including an overview of industry growth and associated infrastructure and workforce needs to support that growth.
- Chapter 5 draws on existing strategic plans and the group’s discussions to present a compendium of education issues and needs generally, and specific workforce development strategies for some of the Innovation Zone industries.
- Chapter 6 contains public policy recommendations to promote growth, economic vitality and innovation in the Zones. These recommendations were synthesized from a number of sources, including existing and draft policy reports prepared by the participating organizations, current and proposed legislation to support workforce development and industry innovation, and the Working Group’s discussions.

2.0 INNOVATION ZONE DEFINITION AND FRAMEWORK

2.1 Innovation Zone Definitions and Principles

A starting point question in this process was to ask and answer the question: “what is an Innovation Zone?” The Discussion Paper that accompanied the original Innovation Zone Planning Grant application postulates that Innovation Zones are specific geographic areas where leading edge companies, major research institutions, highly skilled workers, and substantial public resources have concentrated to improve competitiveness and productivity. Businesses and institutions in these Zones benefit from opportunities for collaboration, a large well-qualified labor pool, and “branding” as a great place to do business.

The Working Group discussed this initial definition of an Innovation Zone and agreed that these types of dynamic clusters of businesses and research institutions are valuable drivers in a research-based economy. A vibrant Innovation Zone fosters random interactions between companies, researchers, and entrepreneurs that often lead to collaborative partnerships and innovation. The Working Group agreed that there are several areas in the Puget Sound region that are likely Innovation Zone candidates that would benefit from additional State support.

Relationship to Industry Clusters

In the Puget Sound region, the Prosperity Partnership has developed a Regional Economic Strategy based on the concept of supporting the region’s strongest and most dynamic industry clusters. Clusters, as defined by the Prosperity Partnership, are very similar to Innovation Zones. Clusters are geographically concentrated cooperation networks of interdependent firms, research and development institutions, and other intermediary actors (such as universities, economic or regional development agencies, chambers, etc.), where the close contacts of the members and the continuous, fast knowledge exchange between them contribute to the competitive increase of both the members and the whole region.

One of the first issues the Innovation Zone Working Group dealt with was how to distinguish Innovation Zones from industry clusters and to determine how Innovation Zone policies could complement existing cluster-based policies. The group decided that Innovation Zones could build upon and strengthen regional cluster strategies by focusing on sub-regional zones of dynamic economic activity, innovation, and growth potential. Essentially, Innovation Zones could be seen as sub-regional economic clusters.

Geographic or Industry Based Zones

The next issue the Working Group tackled was whether to base the Innovation Zone designations on specific industry activity or to take a purely geographic approach. For example, Redmond has strong Information Technology and Life Sciences industries and could be thought of as a “Redmond Innovation Zone.” However, after looking over employment maps and discussing industry-specific needs, the Working Group decided to designate industry-specific Innovation Zones. Rather than creating one “Redmond Innovation Zone”, the group created separate IT and Life Sciences Innovation Zones that overlap in Redmond.

Organizing Principles

The regional industry clusters identified by the Prosperity Partnership were a helpful starting point for Innovation Zone discussions. However, drawing boundaries around specific Innovation Zones highlighted many tensions centered on industry interactions, geography, and fundamental definitions. Through these discussions, the following considerations and organizing principles were developed to guide the group's decisions:

#1: Cluster Maturity and Geographic Implications. Industries and clusters have life cycles – some are older and more established, some are emerging and still evolving. Some Innovation Zones are centered on well-defined mature centers of activity, while others are aspirational and less defined.

Principle: Innovation Zones can be mature or aspirational. The more established the cluster (and hence the higher the concentration of employment), the tighter the Innovation Zone can be drawn. The more emerging and evolving the cluster, the broader the geographic boundaries should be drawn.

#2: New Zones May Grow and Evolve. As industries and geographic areas grow, new Zones may emerge and be appropriately designated as Innovation Zones. An example may be Pierce County's aerospace businesses, which could grow over time, and with enough employment concentration, become an Aerospace Innovation Zone.

Principle: Innovation Zones are not static. Revisit Innovation Zones over time, to take into consideration changing trends and industry growth and development.

#3: Some Stakeholders May Prefer Broader Geographic Boundaries. Creating a "Zone" will, by definition, include some jurisdictions and firms, and exclude others. Moreover, some organizations may have compelling arguments for broader Zones. The Washington Biotechnology and Biomedical Association, for example, has proposed a West Coast Life Sciences Cluster from California to British Columbia, arguing that "the combined strength and influence of such a cluster could attract investment from Pacific Rim nations and elsewhere and also facilitate interaction among scientists and research institutions...and that there are many business and commercial ties across the region. Two of the largest life sciences companies in the world have people and operations in California and Washington – Amgen and Genentech. A good many researchers, companies and institutions have cross-border collaborations, some contractual in nature, others merely loose alliances or professional networks."

Principle: Discuss the Innovation Zone proposal with affected stakeholders, and revisit the Zones over time, as the concept evolves and matures.

#4: Inter-Zone Collaboration, Overlap, and Connections Exist and Should be Encouraged. Certain clusters may benefit from close proximity to each other, sparking collaboration and innovation between and among Innovation Zones. In fact, several of the Innovation Zones selected by this Working Group have synergistic relationships and boundaries that overlap. Logistics and Trade Innovation Zones, for example, benefit greatly from innovations in the Information Technology and Clean Technology sectors.

Principle: Look for, assess and encourage inter-Zone connections and linkages.

#5: Innovation Zone Needs Are Not Limited to Zone Boundaries. Some investments needed to support Innovation Zones can be made within the Zones while others are regional in nature and cross industry and Zone boundaries. For example, a quality higher education research institution does not need to be directly in an Innovation Zone to meet the Zone's needs; it only needs to be *near* an Innovation Zone.

Principle: Innovation Zones may focus on a small geographic area but industry needs in the Zones include many cross-zone, region-wide issues. Innovation Zone investments must support the Zone but do not necessarily need to be *in* the Zone.

#6: Innovation can be Found in All Industries. The term innovation is often used to describe high-tech industries but innovation can be found in any industry from agriculture to biotechnology.

Principle: Innovation Zones should recognize innovation broadly and not be limited to high technology fields.

#7: Effective Selection, Appropriate Number, and Scale of Innovation Zones. For an Innovation Zone program to be successful, Zones need to be selected using a rigorous, well-defined set of criteria and not be allocated by an even distribution system (e.g. one zone per county, or one zone per number of residents in an area). Effective selection of Innovation Zones must also take into account the pool of resources available to support the Zones. If there are too many Innovation Zones State resources will be diluted and have little impact. If there are too few Innovation Zones, many promising clusters of activity will be denied the opportunity to become Innovation Zones. Where to set the bar for Innovation Zone designation will depend on additional analysis of potential Zones throughout the state and a better understanding of what resources will be directed to the Zones.

Principle: Innovation Zone selection should be based on a set of rigorous and well-defined criteria. Criteria should be stringent enough so that there are not too many or too few Zones to be adequately supported by the State.

2.2 Inputs Used to Identify Primary Industry Clusters in Prosperity Partnership Study

The following four inputs are the primary criteria used by the Prosperity Partnership to determine industry clusters in the Puget Sound region. Because the Working Group started with the Prosperity Partnership clusters to determine specific Innovation Zones, these inputs are indirect initial criteria for the Puget Sound region's Innovation Zones.

- 1. Employment Concentration Ratio (Location Quotient)** – Sectoral share of the region's employment relative to the national average share.

The employment concentration ratio (ECR) is the most essential aspect of this analysis. A concentration ratio greater than one suggests that the cluster is more concentrated in the region than it is at the national level. It is calculated using employment levels that existed in 2001. ECR measures an industry's concentration in a region relative to the country as a whole. It compares an industry's share of local employment with its share of national employment. An ECR of greater than 1 implies that the industry produces more goods and services than required to meet the demands of the local market. More than likely, the industry is exporting the good or service out of the region.

- 2. Projected Employment Growth** – Indicator of momentum, potential, and industry dynamism.

The relative growth rates are expressed as the "industry dynamism" concept. We determined industry dynamism for each cluster by adding up the real gross output of each industry within the cluster and then calculating the compound average annual growth of the cluster's total real gross output. Importantly we used the real gross output of each industry at the U.S. national level to capture the macroeconomic or national trends. We considered the period 2003 to 2008 to reflect each cluster's medium-term potential.

- 3. Linkages** – Sectors with common suppliers or markets.
- 4. Local Experts** – Local expertise offering information and insight to shape cluster definitions.

2.3 Criteria for Identifying Innovation Zones Within a Region

Below is a list of Innovation Zone criteria the Working Group brainstormed. The criteria are not absolute requirements for an Innovation Zone but they highlight the factors that contribute to an Innovation Zone's growth potential and capacity to handle economic activity. The criteria that a Zone may be weak in are key targets for improvement and future investment.

It is important to note that criteria for Innovation Zones will differ for mature clusters and emerging clusters. For example, an innovative mature cluster may focus on the value of *job retention* in their industry while an emerging industry cluster may focus on the tremendous *job growth potential* in their industry.

A. *Employment and growth potential*

- High employment concentrations within an industry – a critical mass of activity that promotes co-location, collaboration, and innovation. Employment concentration ratios and location quotients at the regional and Innovation Zone level are possible measures.
- Growing or expected to grow in near future – able to demonstrate growth or retention of sustainable-wage jobs.
- Concentration of innovative or technologically advanced companies
- Has network of supportive services, including distribution, legal, professional and technical services
- An anchor tenant or tenants with status and a solid reputation as a regional, national, or global leader in the industry.

B. *Workforce needs and support*

- Has defined workforce needs and access to a qualified labor pool
- Has access to quality educational institutions, including K-12, community college, and higher education

C. *Infrastructure capacity*

- Has adequate land and facilities to accommodate industry needs and growth
- Is accessible to the labor force, by road, mass transit, rail, ferries
- Has at least some telecommunications coverage and service, for access to the Internet and wireless communications
- Has some minimum amount of retail and amenities needed to support employment base

D. *Investment potential and commitment*

- Potential of industries to leverage state investment with federal and private investments
- Demonstrated commitment of investment and resources by industry. This indicator is most important for aspirational clusters that are more volatile.

2.4 Quantification or Measurement of Criteria Used to Identify Innovation Zones

In order to apply the criteria listed in Section 2.3 to an Innovation Zone program, detailed and quantifiable measures and benchmarks must be developed. The measures should establish minimum requirements for Innovation Zone eligibility as well as a set of recommended elements and targets. The Working Group agreed that separate criteria should be established for mature Innovation Zones and aspirational emerging Innovation Zones. Although the Working Group did not have enough time to develop detailed measures for each criterion listed above, the group did spend time discussing innovation and ways in which it can be measured.

How Can Innovation be Measured?

If innovation can be found in any industry it is hard to use any single measure to define innovation for all industries. For example, innovation in the wine industry may be measured by looking at the types of soils, grapes and agricultural processes being used rather more traditional measures of innovation in high tech industries like the number of advanced degrees or R&D staff working in the industry.

By taking a broad view of innovation, a range of indicators are needed to measure innovation and highlight where an industry's competitive advantage lies.

Sample Innovation Measures

Listed below are a several potential measures of innovation collected from the Working Group and drawn from the *2005 Washington Technology Center Index of Innovation and Technology*.

- Percentage of employees engaged in R&D activities (The U.S. Bureau of Labor Statistics and Technology Alliance use 10% to identify high-tech industries)
- Number of employees with advanced degrees
- Innovation capacity
- New company creation
- Company closings
- Patent generation
- Top technology patent areas
- Patents by industry
- Federal funds for research and development
- Research and development expenditures
- Public Sector Investment

These measures and other similar quantifiable measures should be developed for each criterion listed in Section 2.3. The State should consult with local workforce development, economic development and industry stakeholders in finalizing an appropriate set of Innovation Zone criteria and the Puget Sound Innovation Zone Working Group looks forward to being a part of this process.

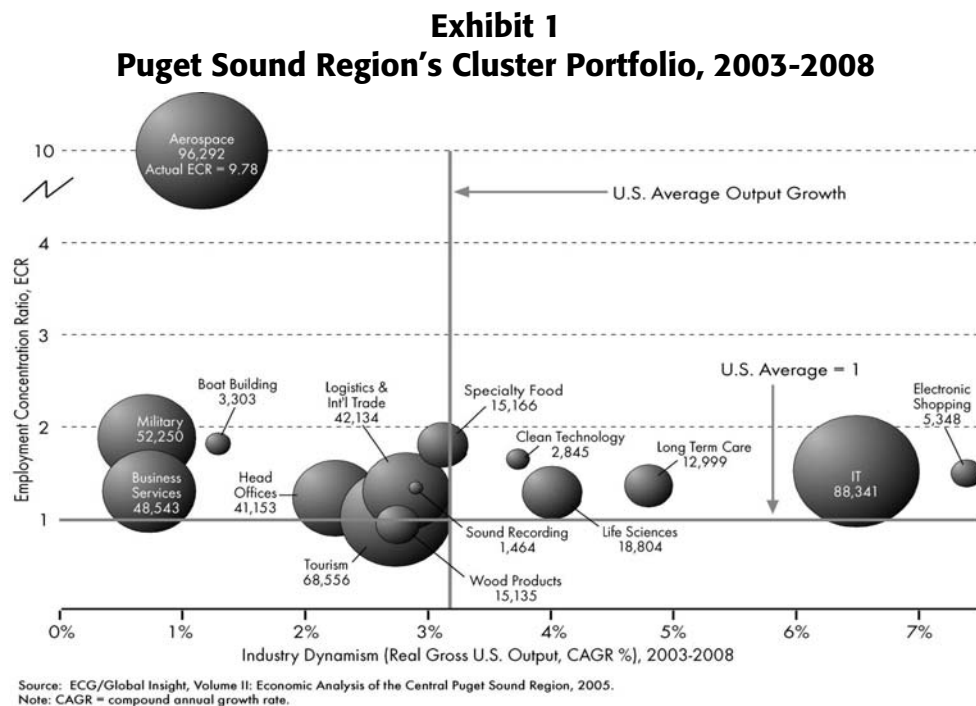
3.0 PUGET SOUND INNOVATION ZONES

3.1 Background and Clusters Identified

The starting point for Innovation Zone selection process was the set of regional industry clusters identified by the Prosperity Partnership. Using the inputs listed in Section 2.2, the Prosperity Partnership identified the following 15 established clusters in the Puget Sound region:

- Aerospace
- Boat Building
- Business Services
- Electronic Shopping
- Environment & Alternative Energy
- Head Offices
- Information Technology
- Life Sciences
- Logistics & International Trade
- Long Term Care
- Military
- Sound Recording
- Specialty Foods
- Tourism
- Wood Products

Exhibit 1 shows the relative size of these industry clusters (circles are sized in proportion to the number of jobs in an industry) and how each industry compares on two axes – their competitive market position (ECR) and dynamism of their markets.



Of these industries, five pilot clusters were selected to undertake a working group process to develop strategies and action initiatives around each cluster. The five pilot clusters are Information Technology, Life Sciences, Aerospace, Logistics and International Trade, and Clean Technology.

Five Pilot Clusters and Associated Sub-clusters¹

Listed below are the five pilot clusters, their associated sub-clusters, and brief profiles of key cluster characteristics. The Working Group used these five clusters as a starting point for its Innovation Zone designation discussions.

Information Technology

This cluster includes a wide range of industry sectors. The primary components of this cluster include telecommunications, computer and on-line services, software, electronic entertainment, and computer and electronic manufacturing. This cluster exceeds the average U.S. employment concentration ratio by 50 percent - some components are highly concentrated, whereas others are more dispersed throughout the region. Information Technology is a Prosperity Partnership Star Cluster and contains over 88,000 jobs in the region.

Information Technology Subclusters

- Software – largest industry in cluster (30,000 jobs); high job growth and projected growth; highest ECR (3.3)
 - Computer Systems Software
 - Computer Applications Software
 - Key sub-group – Entertainment (gaming and animation)
 - Key sub-group – mobile applications – a strength in the region
- Telecommunications – 27,000 jobs; ECR 1.6
- Computer and On-Line Services – 25,000 jobs; ECR 1.17
 - Online Services – Google
 - E-commerce – Amazon
- Hardware Manufacturing – smallest in cluster (6,000 jobs); low ECR (0.5); high dynamism; unlikely to show future growth in the region.

Life Sciences

This cluster includes a number of industry sectors. The primary components of this cluster include health, laboratory, and instrument-related manufacturing, laboratories, and the related wholesalers for these products. This cluster exceeds the average U.S. employment concentration ratio by 30 percent, and is spread throughout the region. The Life Sciences cluster is a Prosperity Partnership Star Cluster.

Life Sciences Subclusters

- R&D – key industry driving cluster's dynamism – anchored by Fred Hutchinson Cancer Research Center and UW
- Medical Apparatus Manufacturing
- Electronics and Devices
- Medical Laboratories
- Drug Manufacturing
- Hospital Equipment and Supplies Wholesaling

¹ *Economic Analysis of the Puget Sound Region: Volume II of the Regional Economic Strategy*. Prosperity Partnership. September 27, 2005.

Aerospace

The major components of the Aerospace cluster include aircraft manufacturing, guided missile and space vehicle manufacturing, and a few related components of instruments. This cluster vastly exceeds the average U.S. employment concentration ratio and the cluster is represented in a number of highly concentrated areas in the region. Aerospace is a Prosperity Partnership Mature Cluster with over 96,000 jobs in the region, primarily in the Boeing Company.

Aerospace Subclusters

- Aircraft Manufacturing
- Guided Missile and Space Vehicle Manufacturing
- Aircraft Parts Manufacturing
- Measuring and Controlling Device Manufacturing – subcluster with the greatest dynamism

Logistics and International Trade

This cluster includes the largest number of specific industry components; however, the number of industry sectors is not that large. The primary components of this cluster include air, sea, and freight transportation and the related operations, shipping, and handling, product storage, and support services related to financing. This cluster exceeds the average U.S. employment concentration ratio by 30 percent, and is spread throughout the region, with heavy concentrations within the region's designated manufacturing/industrial centers. Logistics and International Trade is a Prosperity Partnership Mature Cluster with over 42,000 jobs in the region.

Logistics and International Trade Subclusters

- Air Transport – largest in cluster (18,000 jobs); only industry in cluster with above average dynamism; generated over 50% of activity in cluster.
- Truck Transport and Support Activities
- Rail Transport
- Water Transportation
- Warehousing

Clean Technology

This cluster includes a smaller number of specific industry components, although they span a number of industry sectors. The primary components of this cluster include clean manufacturing and environmental improvement products, environmental remediation services, consultant services, recycling, green building, and clean energy. Portions of the cluster, including alternative fuels and energy retrofit services, are growing rapidly. This cluster exceeds the average U.S. employment concentration ratio by 30 percent. Clean Technology is a Prosperity Partnership Star Cluster with over 3,000 jobs in the region.

Clean Technology Subclusters

- Solid Waste Combustors and Incinerators – highest ECR (5+)
- Environmental Consulting Services – includes alternative energy
- Air Purification Equipment Manufacturing
- Materials Recovery Facilities – high ECR (3+)
- Hazardous Waste Treatment and Disposal
- Environment, Conservation and Wildlife Organizations

3.2 Final Puget Sound Innovation Zones

Starting with the five Prosperity Partnership Pilot Clusters, the Working Group first looked at regional employment concentration maps as a proxy for many of the Innovation Zone criteria listed in Section 2.3. After general areas of employment concentration were identified, the Group discussed Innovation Zone criteria in detail and tried to narrow the areas down to well-defined Innovation Zones. Listed below are the nine Innovation Zones identified by the Working Group.

Information Technology Innovation Zones (2)

- E-Side: Redmond, Bellevue, Kirkland
- Seattle: Fremont, University District, Eastlake, Elliott/Mercer, Downtown, Pioneer Square, Beacon Hill

Life Sciences Innovation Zones (2)

- South Lake Union/Interbay/UW Corridor
- SE Snohomish/NE King: Bothell to Redmond

Aerospace Innovation Zones (2)

- South King County – South Seattle, Renton, Kent, Auburn
- Paine Field, Snohomish County

Logistics and Trade Innovation Zones (2)

- South Seattle, Port of Seattle, SeaTac, and South King County
- Port of Tacoma and surrounding area

Clean Technology Innovation Zone (1)

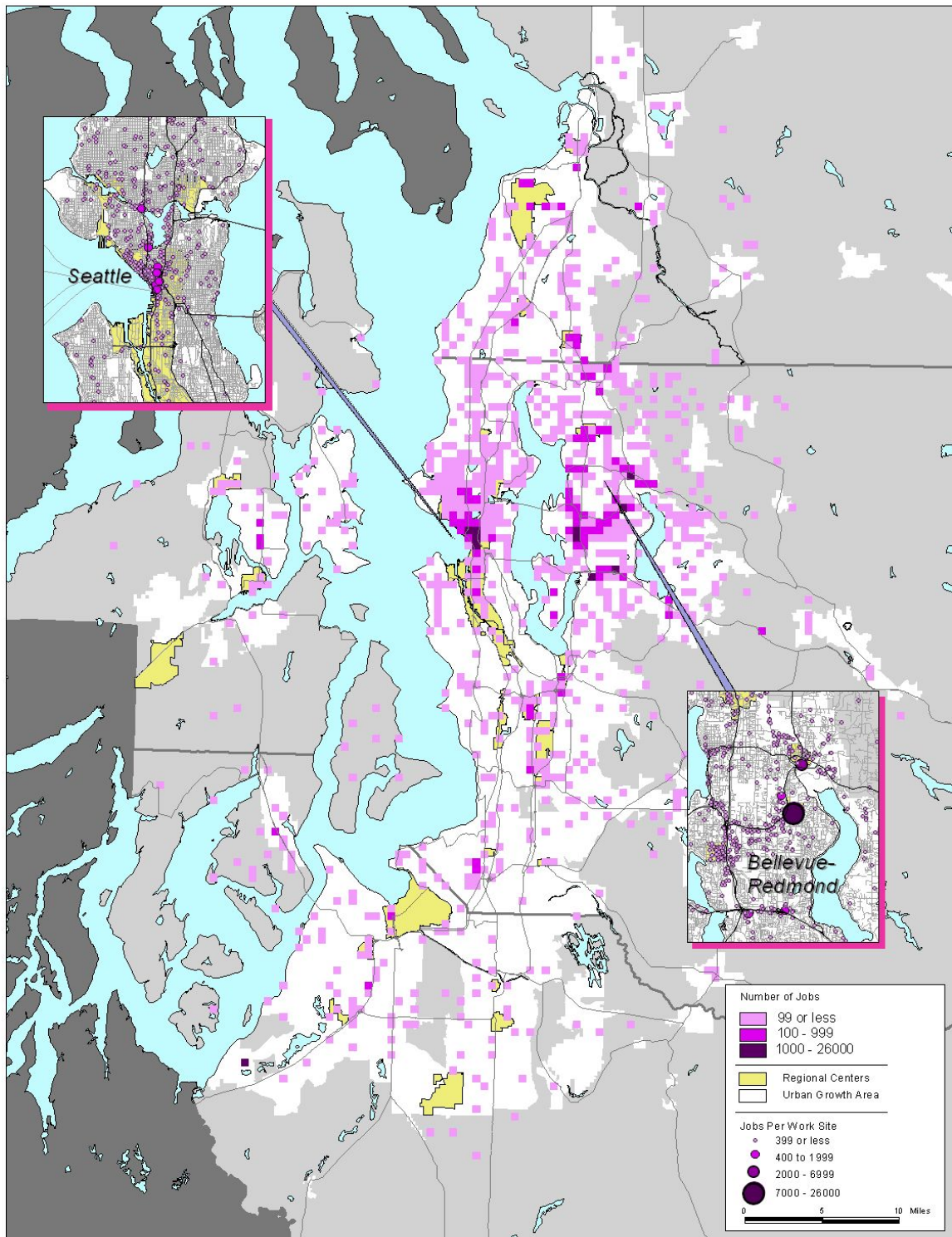
- Clean Technology is an emerging cluster with no clearly defined area of activity to focus on, so a region-wide emerging Innovation Zone is proposed for the Clean Technology industry. See Section 3.4 below for a discussion on how the Working Group envisions emerging Innovation Zones like Clean Technology fitting into a two-tiered Innovation Zone system.

3.3 Employment Concentration Maps for Primary Industry Clusters

The following pages show the employment concentration maps the Working Group used to inform its Innovation Zone designation process. Areas of high employment density are called out in the maps and have a strong correlation to the final Innovation Zones.

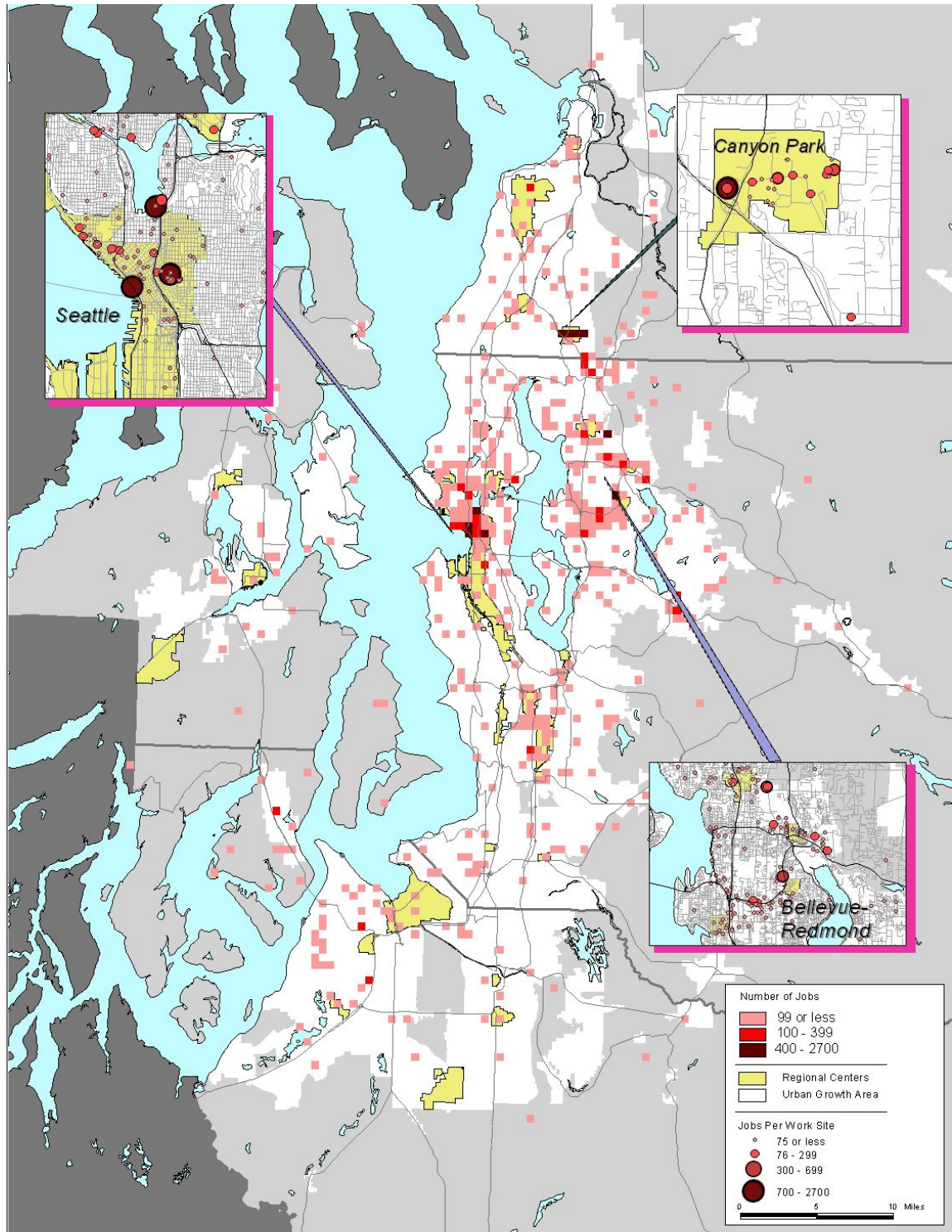
Exhibit 2

Employment Concentration of Information Technology Cluster, 2002



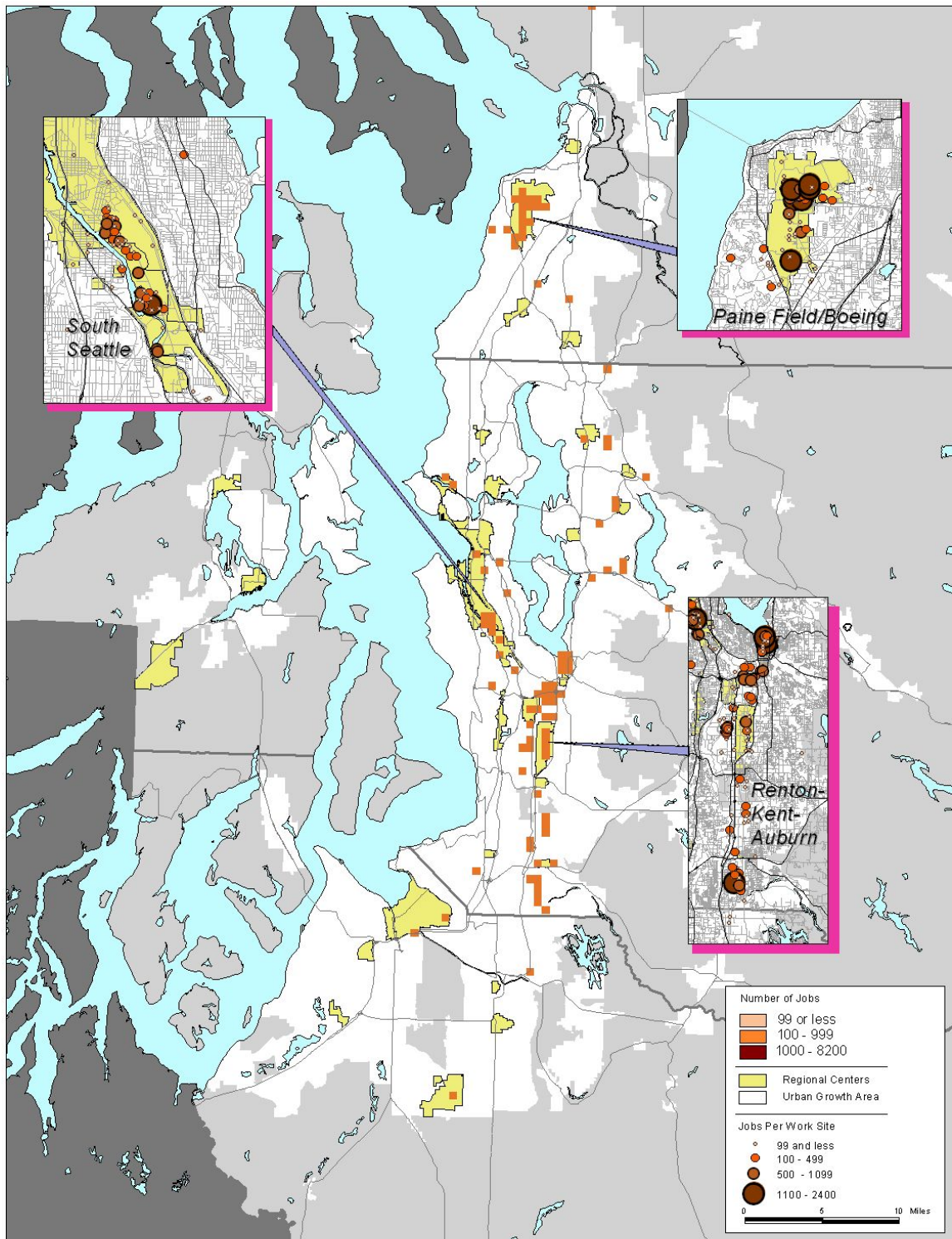
Source: Employment Security Department, Puget Sound Regional Council, 2002

Exhibit 3 Employment Concentration of Life Sciences Cluster, 2002



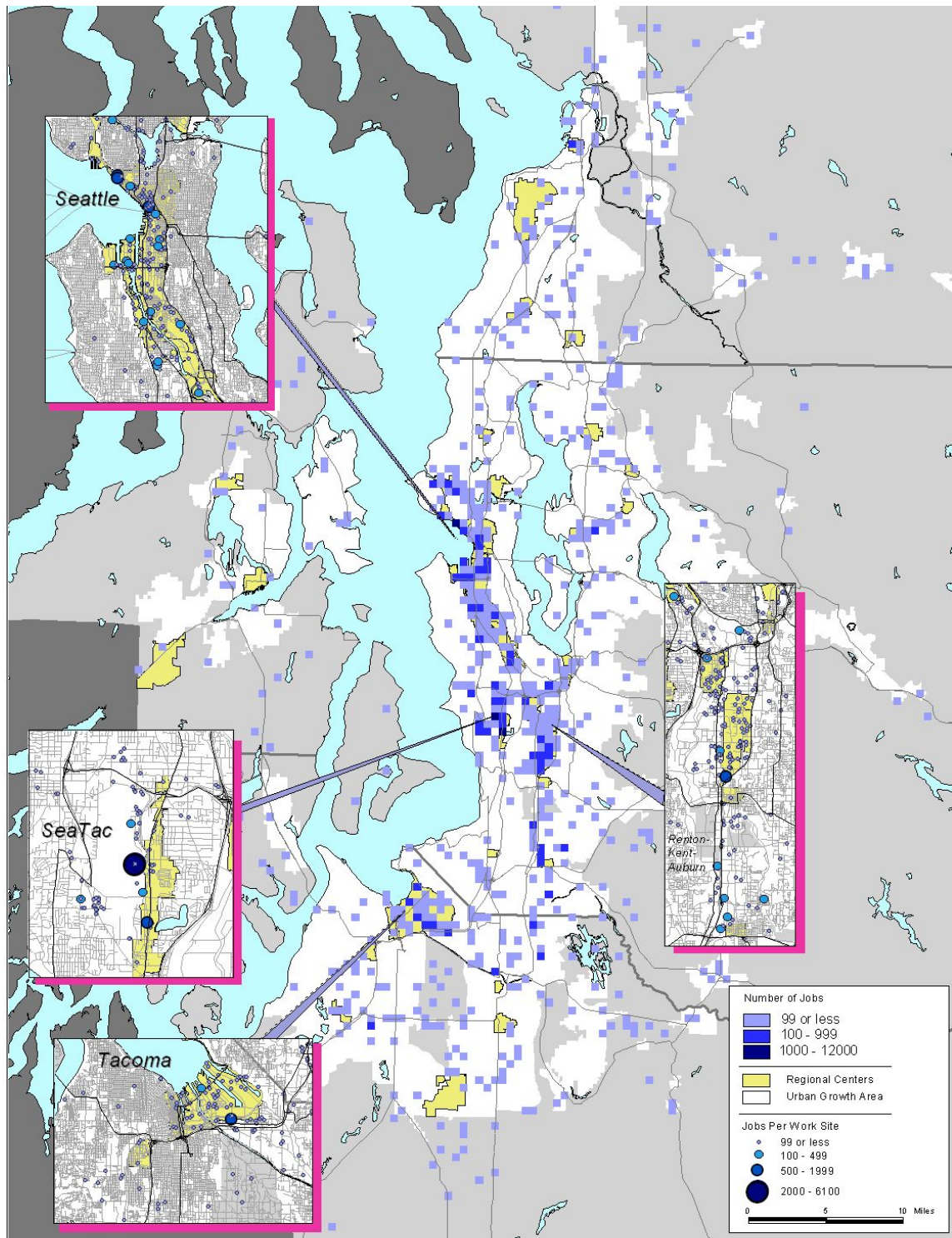
Source: Employment Security Department, Puget Sound Regional Council, 2002

Exhibit 4 Employment Concentration of Aerospace Cluster, 2002



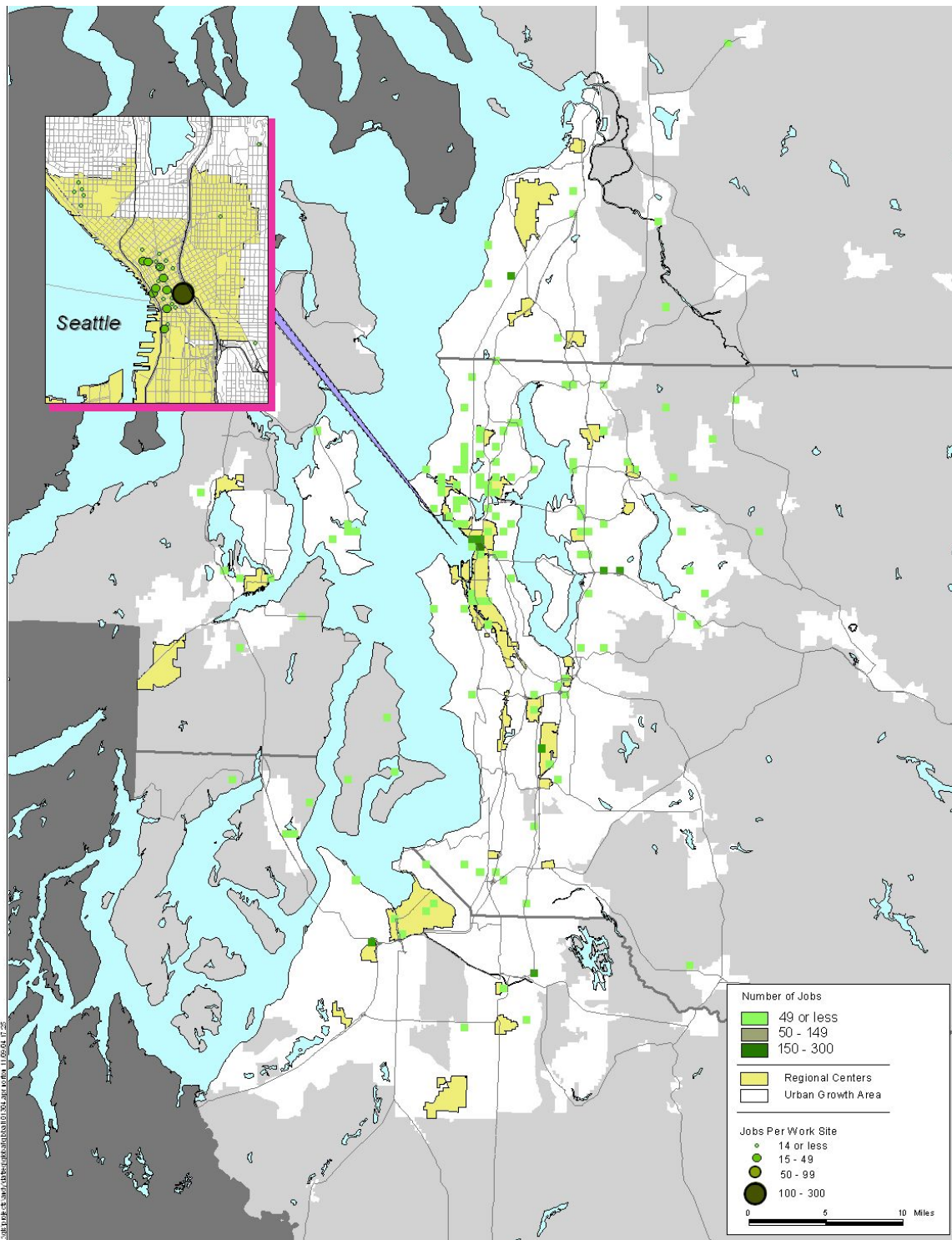
Source: Employment Security Department, Puget Sound Regional Council, 2002

Exhibit 5 Employment Concentration of Logistics and International Trade Cluster, 2002



Source: Employment Security Department, Puget Sound Regional Council, 2002

Exhibit 6 Employment Concentration of Clean Technology Cluster, 2002



Source: Employment Security Department, Puget Sound Regional Council, 2002

3.4 Implementation of an Innovation Zone Policy

After deciding on Innovation Zones in the region and criteria for defining them, the Working Group spent some time discussing how an Innovation Zone policy or program could be implemented. This section documents a hypothetical process the State could use to put an Innovation Zone policy into place. Several elements of this proposed process are necessarily vague because many details about Innovation Zones are still being determined. However, in general, the proposed Innovation Zone program is grounded in the organizing principles presented earlier in Section 2.1.

Basic Framework: A Two-Tiered System

The Innovation Zone program should recognize both mature and emerging clusters of economic activity. Mature industries like Aerospace have well-established concentrations of activity that need to be supported to maintain high levels of innovation and market dominance in the industry. Emerging clusters of innovative activity in industries like Clean Technology also need to be supported so they can grow and eventually become full-fledged mature Innovation Zones. The criteria, needs, and support strategies for these two types of Innovation Zones are quite different and are best addressed in a two-tiered program.

A tiered system acknowledges that Innovation Zones are cultivated over time and do not spring up spontaneously. A tiered program that specifies separate sets of criteria for emerging and mature Innovation Zones will help the State foster innovation in all phases of an industry's growth cycle. Criteria for Innovation Zones should provide a road map showing how an area can start as an undesignated area, grow until it can be designated an emerging Innovation Zone, and if truly successful, finally achieve mature Innovation Zone status. Under this type of system, aspiring industry clusters and local economic development agencies can see what is required to become an emerging Innovation Zone and guide their actions to achieve this designation. Likewise, stakeholders in emerging Innovation Zones can take actions to attain mature Innovation Zone status.

Most importantly, a two-tiered system gives the State flexibility in the types of support it offers to different Innovation Zones. Emerging Zones could be eligible for marketing, branding, and technical assistance support geared towards building momentum around an area or industry with high growth and innovation potential. Mature Zones on the other hand would be eligible for more direct infrastructure and workforce investment. These Zones are already strong and dynamic so additional investment in key industry needs will increase innovation, build the national and international reputation of the Zones, and further improve their attractiveness and market position.

Application Procedure

Rather than have Innovation Zones independently designated by State authorities, the Working Group felt it would make more sense to set up an application process. Local economic development agencies in cooperation with local workforce development agencies and industry groups would put together applications to the State justifying areas within their region for Innovation Zone designations. Applications could be submitted to the Governor's office or a designated agency for review. The Washington Department of Community, Trade, and Economic Development (CTED) was mentioned as a possible review agency.

It is important that criteria for the two types of Innovation Zones be clearly defined and quantified where possible. The designation of Innovation Zones could become a process with political overtones so clear criteria will help jurisdictions understand what is required to become an emerging or mature Innovation Zone. Clear criteria will also help jurisdictions without Innovation Zones understand why their applications may have failed or why their area may not be eligible to become an Innovation Zone yet.

The application process for the Innovation Zone designation could become complicated, particularly for less-sophisticated areas that don't have access to a wealth of economic and industry-specific data. The Working Group discussed the possibility of the State providing technical assistance on applications for smaller industries and less well-developed clusters.

Evaluation and Updates of Innovation Zones

The Working Group recognizes that Innovation Zones, much like the industries they are based on, will be subject to the ebbs and flows of business and produce life cycles. Innovative clustering activity is very dynamic and will change over time, so Innovation Zone designations should neither be static nor permanent. An Innovation Zone program should have the flexibility to adjust Innovation Zone boundaries, create new Zones as they emerge and mature, and remove Innovation Zone designations if they are no longer appropriate.

A key mechanism to ensure this flexibility is that Innovation Zone designations should last a given amount of time before their Innovation Zone status "sunset" and needs to be renewed. These durations should be longer for mature Innovation Zones and shorter for emerging Innovation Zones that should be subject to more periodic review. The Working Group did not decide on exact time periods to recommend but would like to see the designations be long enough to indicate the State's commitment to a Zone but not so long that the program loses the flexibility to adjust to changing cluster trends. An alternative sunset mechanism the Working Group discussed was the use of specific minimum criteria that trigger a review of an area's Innovation Zone status if crossed (e.g. if an Innovation Zone's employment concentration drops below the national average it has its Innovation Zone status reviewed).

In addition to the "sunset" provision on Innovation Zones, there should also be regularly scheduled evaluations of existing Zones to assess progress in an Innovation Zone, adjust Zone boundaries if appropriate, and determine if an emerging Innovation Zone has grown to the point where it can be considered a mature Innovation Zone. It is possible that some Innovation Zones may fall short of expectations, particularly those centered on less established emerging industry clusters. In cases where an industry cluster does not meet expectations and is no longer expected to grow dynamically, Innovation Zone designations should be allowed to sunset. On the other hand, an emerging Innovation Zone that experiences significant growth and clustering activity can cross the threshold and become a mature Innovation Zone.

Evaluation of Innovation Zone progress should also be used to gauge the effectiveness and return on investment of public funds. The Innovation Zone program could prove useful in determining the types of public investment and policies that are best able to spark geography-specific innovative activity.

PART 2: INNOVATION ZONE NEEDS AND STRATEGIES

4.0 INFRASTRUCTURE AND WORKFORCE NEEDS OF INNOVATION ZONE INDUSTRIES

Original Question

What specific technological advances are likely to be central to the economic future of the primary industry or industries in the Innovation Zone you are defining? This should be a brief explanation of the likely technological trajectory of the industry or industries and the infrastructure and workforce skills needs associated with that evolution. The discussion should explore product and process innovations and associated capital and skill changes.

4.1 Overview and Approach

The Working Group took a three-part approach to this question:

- A. Identify infrastructure, workforce, and other broad needs within the region, which span the Innovation Zones identified.
- B. To the extent feasible, research and assess the trajectory of the industries within the region's proposed Innovation Zones, with a focus on workforce skills needed to facilitate growth and innovation.
- C. Identify additional research opportunities within the Innovation Zones, at the company level, to provide more specific and detailed information on both the infrastructure and workforce needs of firms in the Zones.

4.2 Supporting Infrastructure Needs Across the Innovation Zones

Four major infrastructure needs were identified as necessary to support growth and innovation in the Zones. Three of these foundational needs – transportation and mobility; internet access; and electrical power – are public sector responsibilities. The fourth need, office and manufacturing/distribution space for start-up firms, is a function of the real estate market, although there could potentially be a supporting role for certain government agencies, such as ports, to provide affordable space near to or within the Zones. Each of these needs is discussed briefly below:

Transportation and Mobility

Industries require their employees, suppliers and service providers to have efficient access to their sites. Depending on the location, firms have different transportation and access challenges, ranging from traffic congestion to remote site access. Some firms, Amgen for example, are now privately providing employee transportation services to their sites. Amgen contracts for van service to transport its employees around the region, including from the downtown Seattle Washington State Ferry dock to its Helix campus near Interbay, as well as to downtown (for lunchtime shopping and dining), and to its Bothell campus. However, many firms in the region are not able to provide such services, regardless of the need.

In general, all of the Innovation Zones identified could benefit from enhanced transit service, from an operational perspective, as well as an employee attraction and retention strategy. Other non-motorized transportation access, such as bike paths, are also helpful in ensuring mobility and access to the workforce.

Next steps and recommended strategies. Inventory and assess transportation and mobility needs for each Innovation Zone. Develop this needs assessment by conducting interviews with major employers and other firms in the Zone, to effectively assess the specific needs for the firms and workforce within each Zone.

Internet Access: Broadband and Wireless Infrastructure

To be competitive, all Innovation Zones need full access to the internet and other electronic communication platforms and tools. However some Zones lack such infrastructure and services, and this is a competitive disadvantage to firms in these areas, and a disincentive for others to locate there. It is also a competitive disadvantage to the state's and the region's public research institutions. The Washington State Biotechnology and Biomedical Association's (WBBA) 2006 Life Sciences Report recommends enhancing information technology infrastructure to provide high-speed data connections to all public research institutions, noting that through the Pacific Northwest National Laboratory, the State's research community has the potential to use one of the country's most powerful life science computing resources. However, to access this resource, greater deployment of extremely high bandwidth networks and data storage is needed, and all research institutions in the State should have access to GigaPOP network bandwidth.

The challenge in this area is twofold: first, to identify where the broadband/wireless service gaps exist, and secondly, to develop and implement strategies to address how the gaps can be filled and service provided. Research on this issue has shown that the telecommunications service providers consider their service areas and plans to be proprietary, and simply identifying what service providers serve which areas, where additional service is needed and when it is planned to be provided can be difficult to obtain.

Next steps and recommended strategies. The telecommunications and internet infrastructure needs for each Innovation Zone should be inventoried and assessed, with actionable strategies developed to obtain service for those areas not currently served.

Electrical Power

Many of the industries in the region's Innovation Zones have major power needs, including the Life Sciences, Information Technology and Aerospace sectors. Access to adequate power supply is a factor in locational decision-making, and the demand for low cost power will increasingly drive some facility decisions made by major companies. A recent example of this situation is the acquisition and siting of major data storage facilities in Central Washington by companies such as Google and Microsoft. With available and low cost land, and low cost power, communities such as Quincy, Washington are seen as attractive places for off-site storage and back-up facilities.

Next steps and recommended strategies. The power needs for each Innovation Zone should be inventoried and assessed, both in the short-term, and in the longer-term (20 years). Additional information on the current situation and needs within the Zones will help determine what, if any, action strategies are needed to support the Zones.

Business Space Needs

The need for available space for start-up companies has been identified as a major factor in the growth of innovating companies in the Puget Sound. Depending on the industry, space needs will vary from office, to lab space, to small-scale manufacturing and distribution. However, the challenge of finding accessible, low-cost space is a common denominator for all space types.

Next steps and recommended strategies. Through interviews with firms of varying sizes and types, Inventory and assess space needs and challenges, by Innovation Zone. Use this base of information to determine the most effective action strategies to meet the needs of the Zones. Strategies could range from partnering for new space development, to communications and information dispersal approaches.

4.3 Other Regional Needs that Impact All Innovation Zones

Technology Commercialization

The stage in business development where a company transitions from R&D to the market is often referred to as the “Valley of Death” because so many so many businesses fail to adequately market and produce their innovative new products and processes. An intelligent blend of public, private, technical, and financial resources is needed to bridge the Valley of Death and ensure success for the region’s most promising innovations.

In the Puget Sound region, while there are enormous resources for research and development and other sources of innovation, the system of “technology commercialization” in the region has weaknesses that result in fewer businesses being launched on the back of new technologies than should be the case.²

In 2004, after five years leading the nation in new company creation, Washington placed second behind Idaho. In contrast, Washington had the highest rate of business closures in 2004.³ It is clear that Washington is a leader in entrepreneurial business creation, with the bulk of growth occurring in the Puget Sound region. Increasing support for technology commercialization will build on the State’s entrepreneurial strength and help reduce the rate of business closures.

Access to Capital

The region is relatively “under-banked” in the sense that its employment in industries such as commercial banking is significantly below the national average; the availability of early-stage capital has been particularly scarce ever since the burst of the tech bubble in 2001; the region shows strength in Small Business Administration (SBA)-backed small business lending per employee, though firms in the region tend to be smaller, on average, than those in peer regions.⁴

² *Economic Analysis of the Puget Sound Region: Volume II of the Regional Economic Strategy*. Prosperity Partnership. September 27, 2005.

³ *2006 Washington State Index of Innovation and Technology*. Washington Technology Center. 2006.

⁴ *Volume II of the Regional Economic Strategy*. Prosperity Partnership. 2005.

The venture capital community in the Puget Sound region is healthy and active, although smaller in scale than in Boston or Silicon Valley. There is an opportunity to encourage more early-state venture capital investment in the region to bridge the “Valley of Death” phase of business development and increase innovative business successes.

Education and Workforce Skills Development

Access to an adequately trained and educated workforce is a critical element for industry growth, and advancement of the Innovation Zones – as a concept and operationally. Strategies to meet labor supply and skill needs are addressed in Section 5.0, and public policy recommendations to assist in funding and developing appropriate workforce training is covered in Section 6.0.

4.4 Industry-Specific Outlook and Needs Assessment

AEROSPACE

Industry Overview and Trajectory⁵

The Aerospace cluster is a very large mature cluster employing over 91,000 people, contributing \$30.8 billion in sales, and representing 9.8% of the region’s economy. The vast majority of firms in the cluster are located in King County—75 firms in 2001. Snohomish had 52 aerospace firms; Kitsap and Pierce had considerably fewer. Firms in the Puget Sound region have weathered the change in the competitive landscape more effectively than firms elsewhere in the U.S. At the national level the number of aerospace firms contracted sharply by 38% during the same period.

Employment in the aerospace cluster in Puget Sound expanded at a very healthy 10% compounded annual average growth rate over the period 1997 to 2001 despite an increasingly competitive international market for commercial airplanes. A contraction in employment in the aerospace sector occurred in 2002 following 9/11 but the airline industry’s economic condition is improving, and with it the outlook for the commercial aircraft market. The recent success of the Boeing 787 operation has strengthened Boeing’s market position and brightened the regional aerospace picture.

Boeing’s strategy to focus on more fuel efficient models the last six years has paid off with substantially more 787 orders being placed compared to its main competitor, the Airbus A350. The 787 is designed with newer efficient engines and a lighter composite body lowering fuel and maintenance costs substantially. Though Airbus is now flying the largest commercial A380 jumbo jet in the world, sales have stalled due to delivery delays and increased demand for smaller aircraft with longer nonstop point to point flights such as the B-777 and 787. Based on list prices Boeing has an even bigger lead over Airbus in the more profitable wide-body twin aisle jets. Boeing’s total aircraft order book at the end of 2005 stands at about \$100 billion – \$30 billion more than Airbus.

⁵ The Aerospace industry overview and trajectory section is drawn from the 2005 Prosperity Partnership *Economic Analysis of the Puget Sound Region: Volume II of the Regional Economic Strategy* document and the *Aerospace Washington State: Vision for the Future* document drafted by the AFA (Aerospace Futures Alliance) and the EDC of Snohomish County.

In the next few years these enormous orders will translate into a rapid ramp-up in production resulting in a continued increase in both engineering and factory related jobs throughout the region. The recent turnaround in international and national growth will continue to fuel more aircraft orders. This growth will stimulate the local manufacturing sector which includes maintenance and modifications services.

In the long term, the world aerospace market continues to look very strong. According to Boeing's latest forecast, the world air travel market is projected to grow at an average rate of 5.2 percent for the next 20 years, although it will grow slowly in the near term. This translates to some 25,000 new commercial airplanes worth \$2 trillion. In the future, a larger share of these aircraft will be delivered to non-U.S. customers. As growth in U.S. traffic slows, the Latin American, Chinese, and other Asian and Pacific markets will lead the world's growth. The increasingly global nature of the air travel market will require that the central Puget Sound region and our Aerospace industry compete successfully on a global scale. There is no question that there will be many jobs in the future Aerospace industry; the question is, where will those jobs be?

Industry Needs for Continued Innovation and Growth

Global supply chains and the location of suppliers and contractors are becoming more and more important to the Aerospace industry. In the Puget Sound region several key Boeing 787 suppliers have yet to make the commitment to locate a significant facility in Washington. Alenia and Vought located their 787 sub-assemblies/systems integration facilities in South Carolina, EADS located their A330 Tanker facility in Alabama and Rolls Royce located an engine testing facility in Mississippi. It is important that the State undertake strategies to attract important suppliers like these to the State and possibly to the Innovation Zones. Suppliers and contractors should be recognized for the important role they play in the life cycle of Aerospace products and existing industry incentives should be extended to them.

As Aerospace manufacturing operations become dependent on complex supply chains and distribution operations, there is also a need for quality transportation infrastructure to improve the mobility and accessibility of products and the workforce.

Workforce Needs

A primary issue for the Aerospace industry is a lack of skilled employees in the state labor pool such as engineers, technicians, and mechanics. The needs for specific skills within the industry vary by business type.⁶ Large Original Equipment Manufacturers (OEM) like Boeing are seeing demand for aircraft machinist and systems engineering jobs continuing to increase, primarily due to continuing strong sales for the 787 and 777 aircraft. Diversified medium-to-large manufacturing suppliers, which contract with large OEM companies, are seeing demand for machinists, mechanics and experts in complex supply-chain processes. Local maintenance, repair, and engineering businesses are seeing demand for machinists, lathe operators, and engineering project managers. Finally, small-to-medium Aerospace suppliers are experiencing a critical shortage of CNC and general machinists and employees with expertise using computer aided drafting software.

⁶ The following specific workforce skills assessments are drawn from the WorkSource Snohomish County document *Aerospace Industry Job Outlook and Skills Demand, Fourth Quarter 2005*.

Overall, the following three skills categories have been identified as primary demand skills:

1. Engineering: Avionics, stress-structural, electrical, flight test, and mechanical. Systems analysts, airworthiness-certification engineers, project managers, computer programmers, procurement analysts, schedulers, planners, tooling, quality assurance-inspectors, and product support-sales.
2. Computer Aided Drafting - CAD (AutoCad, SolidWorks, CATIA).
3. Manufacturing factory machinists (CNC, lathe, mill, and sheet metal), composite assemblers, certified airframe and engine mechanics, material handlers, product assemblers.

Another issue compounding the need for more skilled workers is that a large number of Boeing employees will be retiring in the near future. Over 65% of Boeing's 65,000 employees in Washington will be eligible to retire within the next ten years. An adequate replacement labor pool for all the Boeing retirees is not currently being provided by the State's education system. It is imperative that the State's education system and training programs produce enough skilled individuals to replace all the retiring workers.

Rising labor costs are also having an impact on the competitiveness of Washington's Aerospace industry. Workman's compensation and unemployment insurance rates (L&I) are high and contributing to this challenge.

Policy and Regulatory Needs

Washington's current tax structure can be adjusted to enhance the State's competitiveness in attracting and retaining Aerospace businesses. The 2003 tax package only offered support and incentives to the production side of aerospace operations but did not include R&D activities or suppliers. An improved tax package from the State that includes R&D activities and suppliers is needed.

Prosperity Partnership Aerospace Cluster Action Initiatives

- Recommend short- and long-term legislative action that supports the Aerospace cluster
- Create an aerospace enterprise consortium for small and medium-sized businesses
- Develop an aggressive workforce development initiative
- Form Centers of Innovation in the Technology of Aerospace (CITAs)
- Implement aerospace suppliers incentive program

INFORMATION TECHNOLOGY

Industry Overview and Trajectory

The Information Technology sector can be divided broadly into two categories: (a) producers (firms that produce IT products) and (b) consumers of those products, including businesses and individuals. The Puget Sound's concentration of producers is its strength and what distinguishes the region from other IT centers around the country.

The region's IT producer industry is growing, globally and regionally. With leading companies such as Microsoft experiencing record job growth (a reported net addition of more than 10,000 employees

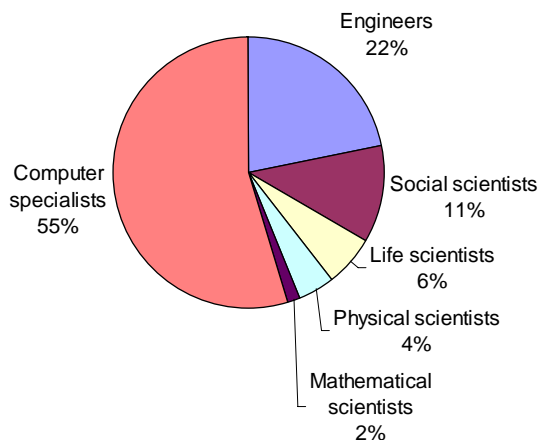
worldwide last year, with 4,000 of those jobs in the Puget Sound area) and other companies including Google are exceeding their forecasts for new employment. Microsoft is also planning for significant employment growth in the short-term by adding space at its Redmond campus for 12,000 additional employees over the next three years. Startup activity has also been strong recently. Both nationwide and in the state, the vast majority of all new jobs in all fields of science and technology are projected to be in computing. Some experts in the industry feel that IT employment growth projections are actually conservative and that even more IT jobs for the region should be expected.

Industry Needs for Continued Innovation and Growth

The Prosperity Partnership's cluster initiative identified four areas important to industry growth: education, research and development, start-up success rates, and business climate. Of these growth drivers, education is far and away the most important need for industry growth. Education needs to support the IT sector are best understood in two ways: by type of training and education needed, and by level of education.

Regarding type of education, the exhibits below show a significant and growing need for training in computer specialties. Exhibit 7 from the Washington Employment Security Department shows that of all science and engineering job openings forecasted for the State between 2002-12, 55% are expected to be in computing. At the national level, computer specialists are forecasted to comprise 59% of all jobs demanded, for the 2004-14 forecast period (Exhibit 8). Exhibit 7 and Exhibit 8 encompass both new job creation and replacement jobs (replacing retiring workers, for example). Examining new job creation alone, Exhibit 9 shows that 71% of projected science and engineering jobs for 2004-14 will be in computing, compared with 15% in engineering (the second highest job growth category), followed by 7% in social science and 4% in life science.

Exhibit 7
Projected Science and Engineering Job Openings, WA
(New jobs plus net replacements, 2002-2012)



Source: Washington Employment Security Department

Exhibit 8
Projected Science and Engineering Job Openings, Nationally
(New jobs plus net replacements, 2004-2014)

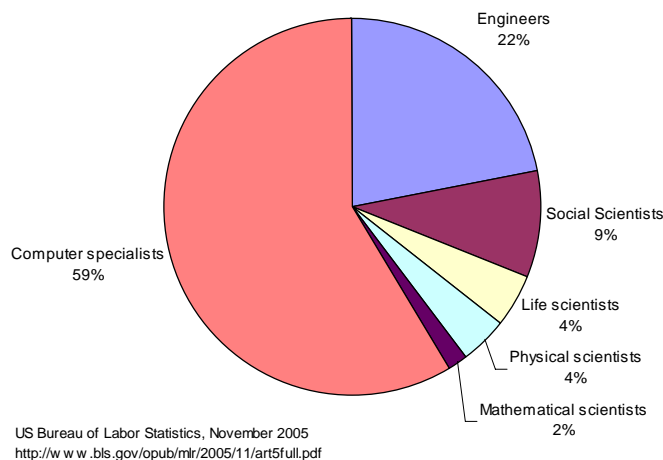
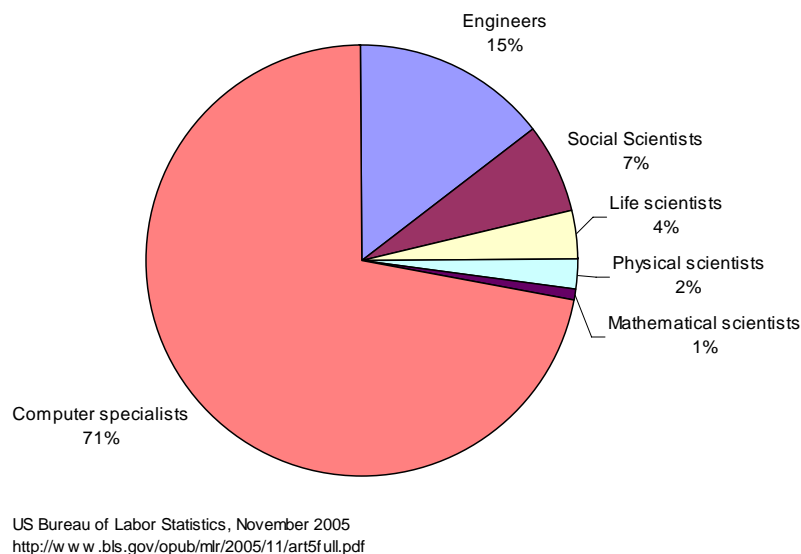
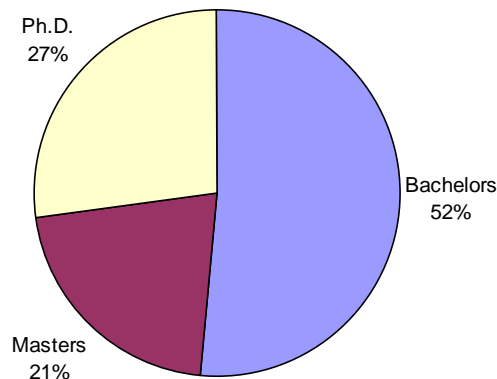


Exhibit 9
Projected Science and Engineering Job Creation, Nationally
(New jobs, 2004-2012)



Assessment of the level of education needed by IT producers shows that a bachelor's degree is the minimum requirement to enter the field, and increasingly, advanced degrees are necessary. Exhibit 10 below illustrates this situation using educational data on the more than 100 University of Washington alumni working for Google, whose Kirkland, WA engineering office is the company's second largest and fastest growing engineering site. As the Exhibit shows, nearly half of the UW alumni working for the company have more than a bachelor's degree, with 21% holding master's degrees and 47% having Ph.D. degrees. Significantly, of these employees, 90% are reported to hold degrees in computer science.

Exhibit 10
UW CSE Alumni at Google (Company-wide), by Education Level



Given these findings, higher education needs to support the Information Technology sector in the region can be summarized as increasing the number of graduates with computer science degrees, at the bachelor's, master's, and doctoral levels. A related need is to provide continuing education opportunities for bachelor's degree graduates to obtain their master's degrees, in order to progress.

At the K-12 level, education needs to support the sector are in math, science and English.

From the IT consumer side, tech support jobs require 2-year degrees and there may be opportunities to implement workforce development strategies to meet these needs. However, the Puget Sound region's competitive advantage is based on the producers of IT rather than the users.

Prosperity Partnership Information Technology Cluster Action Initiatives

- Broaden and strengthen research and development to increase our region's intellectual capital
- Conduct an external marketing campaign that showcases the IT cluster
- Conduct a communications/economic literacy campaign that underscores the benefits of the IT cluster to the region
- Map the "ecology" of the IT cluster

LIFE SCIENCES

Industry Overview and Trajectory⁷

Life Sciences is a star cluster in the Puget Sound region and is very likely to contribute disproportionately to the region's economic growth over the medium term. Industry dynamism is above average at about 4% over the medium term (through 2008). R&D activity is a key to the cluster's dynamism but population trends and changes in government policy are helping certain

⁷ The bulk of this Life Sciences Overview section was drawn directly from the Prosperity Partnership *Volume II of the Regional Economic Strategy* document adopted in September 2005.

industry segments grow at very rapid rates. Employment concentration in the Puget Sound is higher than the national average in R&D, Medical Laboratories, Electromedical Apparatus Manufacturing, Medical and Dental Equipment Wholesalers, and Dental Laboratories.

A growing number of private and public R&D facilities in the region have contributed to the number of innovative ideas and to the dynamism of the Life Sciences cluster. The Fred Hutchinson Cancer Research Center and the University of Washington are at the center of research in the region, although there are a number of other institutes including: SBRI (Seattle Biomedical Research Institute), The Allen Institute for Brain Science, Pacific Northwest Research Institute (PNRI) and the Institute for Systems Biology. Below is a list of the various bioscience/medical research areas at the University of Washington.

- Alzheimer's Disease Research Center
- Center for AIDS Research
- Center for Cell Dynamics
- Center for Ecogenetics and Environmental Health
- Center for Women's Health Research
- Center on Human Development and Disability
- Core Center for Gene Therapy
- Diabetes Endocrinology Research Center
- Genome Center
- Microscale Life Sciences Center
- Pacific Northwest Center for Human Health and Oceans Sciences
- STAART Center for Excellence in Autism
- Virginia Merrill Bloedel Hearing Research Center

Over the five years ending in 2001 the number of Life Sciences firms in the U.S. contracted by 7%, but the cluster in Puget Sound performed considerably better. Employment increased by 4% and the number of firms increased modestly from 723 to 753. All of the net new firms were small (between 1 and 99 employees) in size. In 2001 the Life Sciences cluster employed 18,800 people and contributed sales of \$4.35 billion (measured in constant dollars), which represents 1.4% of the region's economy. The cluster has above average dynamism and an employment concentration 30 percent higher than the national average. Given the strong base of R&D activity in the region the Prosperity Partnership expects that cluster employment and the number of firms will continue on an upward trajectory over the medium term. The Prosperity Partnership also expects that the number of net new establishments will exceed the cluster's performance in the rest of the U.S. economy.

Over the last two decades, the life sciences have flourished in Washington because of a fortunate confluence of exceptional people, great research institutions, and favorable business conditions. The State and the region need to continue supporting this dynamic industry that is vital to our economy.

Industry Needs for Continued Innovation and Growth⁸

The Washington Biotechnology and Biomedical Association (WBBA) has recently invested significant resources and effort to assess the needs of the Life Sciences industry in the Puget Sound. The WBBA's *2006 Life Science Report*, which is still in draft form and is expected to be released in October 2006, is the work of a year-long process of inquiry and dialogue, involving more than 100

⁸ The bulk of this Life Sciences Industry Needs section was drawn from draft language for the WBBA *2006 Life Science Report* scheduled for release in October 2006.

people from business, government, and academia. As part of the process, five working groups were organized around the key challenges and opportunities for the Life Sciences industry: research investments, capital formation, technology commercialization, business climate, and education, workforce and public understanding.

During the past few months the co-chairs of the working groups have been meeting to refine the plan and to develop actions items to support the recommendations of the working groups. In addition, the WBBA Executive Committee has reviewed the plan and has developed an overall context and approach to implementation. The draft plan will be reviewed, discussed, and refined at the WBBA Board retreat on September 8. The revised plan will be presented at the Governor's Life Sciences Summit on September 25. Following that the finalized plan will be presented at the WBBA Annual Meeting on October 31. Listed below are the primary industry needs addressed by the WBBA working groups.

Research Investments. Investments are needed to assist the efforts of various public and private entities, to create synergy between public and not-for-profit institutions, to serve as a magnet for new federal resources and new commercial enterprises, and to foster the creation of new private enterprises.

Capital Formation. Start-up companies in the life sciences typically require relatively small amounts of capital in the earliest stages of development, pose relatively high levels of risk for investors, and typically do not have experienced business management on staff to develop and implement business plans. At the same time, most of the larger venture capitalist funds prefer to make substantial investments in companies that are beyond the start-up phase, that are therefore somewhat less risky, that have functioning business plans, and seasoned management. For fledgling companies, it is difficult to demonstrate the potential of a great but untested concept without a proven track record. To assist these startup companies, there is a need to increase the amount of investment capital available for early-stage investments in Washington's life sciences companies.

Technology Commercialization. As mentioned in Section 4.3, technology commercialization is important for many of the Innovation Zone industries, particularly Life Sciences, where the transition from basic research to business success requires significant investment and expertise.

Business Climate. Companies in the life sciences sector have many of the same requirements as other businesses – consistent rules and regulations across all levels of government, tax structures that permit growth and that generate revenues without hampering business growth, well-educated and willing employees, and solid markets. Life sciences companies also face some unique conditions. For example, it often takes 10 to 15 years between the time a company is formed until it has an approved drug or medical device, and those years are typically filled with frequent setbacks and high costs. The good news is that when a life sciences company succeeds the payoff can be exceptional for investors, for employees and for the state and communities that encouraged success over the long haul.

Education, Workforce, and Public Understanding. More support is needed for education and training of young people throughout the State to assure an educated, well-prepared workforce is available to perform the jobs in Washington's Life Sciences sector. Improvements in the education system will ensure that more of the State's students can attend college and that more graduate with science and engineering degrees.

The need for qualified workers in the life sciences industry is growing, with workers needed in jobs ranging from technicians to PhD researchers. In general, jobs in the life sciences encompass a range of higher paying jobs than in many more established occupations. Employment in this industry includes jobs in computer science, research and development, regulatory affairs, quality control and assurance, medical devices, sales and marketing, manufacturing, and facilities and infrastructure management. Exhibit 11 below shows a sample list of high demand life sciences careers:

Exhibit 11 **High-Demand Life Science Occupations, Wages and Educational Requirements**

Occupation	Avg. Annual Openings		Estimated % Growth 2002-2012	Estimated Mean Wage Per Hour (2004)	Minimum Education Level Required
	2002	2012			
Chemical Technicians	1,509	1,728	15%	\$20.85	AA degree
Biological Technicians	3,014	3,761	25%	\$18.01	Certification and/or AA degree depending on specialty
Agriculture and Food Technician	664	773	16%	\$16.59	Bachelor's to Master's degree depending on specialty
Biochemist and Biophysicist Technicians	139	176	27%	\$38.35	Bachelor's degree plus work experience
Biomedical Engineers	52	66	27%	\$32.30	Bachelor's to doctoral degree depending on the type of specialty plus experience

Source: U.S. Bureau of Labor Statistics; <http://www.careervoyages.com/biotechnology-main.cfm>

Prosperity Partnership Life Sciences Cluster Action Initiatives

- Develop and enact a vision for the Life Sciences cluster
- Create an ecosystem that can mix companies at different stages of development with available technical and financial resources
- Support, improve and build on current life sciences curricula and education programs in K-12
- Develop a concrete inventory of skills and needs to guide decisions by education and training institutions
- Support joint use facilities to encourage collaboration among multiple life science companies and organizations

CLEAN TECHNOLOGY

Industry Overview and Trajectory

The Clean Technology industry cluster is still young and primarily composed of small to medium-sized firms in the region. Of the approximately 400 clean technology firms in the region, the majority have fewer than 100 employees, and many have fewer than 25. The cluster is very diverse, specialized, and dispersed throughout the region so business-to-business networking is a challenge. Trade associations in this cluster are limited in scope so the Prosperity Partnership is in the process of setting up a Clean Technology Alliance to fill this need. The vast majority of Clean Technology businesses are

entrepreneurs and startups so they often face problems with access to capital and tech commercialization. Another challenge Clean Technology companies face is access to external markets since industry markets can be as close as Vancouver and as far away as China.

The Clean Technology industry is being driven by two external factors: the steady increases in the cost of fossil energy and the concern over climate change and global warming. Much of the activity in this sector over the past two years has been in the development and production of alternative energy (chiefly wind and biofuels) and in retrofits of existing facilities for energy efficiency. "Green" building, so-called because of the lower impact on the environment through more sensitive design, more efficient heating, cooling and water systems, and the use of more recycled or sustainably harvested materials, has also surged. Today, one in five facilities built in the region is certified as "built green," a higher percentage than any other region in the country according to the Master Builders of King and Snohomish Counties. Recycling and remediation are largely driven by the public sector, although in some instances (aluminum and steel, for example) it is clearly more cost-effective for industry to encourage recycling efforts. Clean manufacturing and environmental products combine the advantages of reducing energy use with the public relations value of reducing greenhouse gas emissions.

The Clean Technology cluster has many links and unique connections to the other primary clusters. Examples include clean fuels and energy innovations that have strong impacts on Logistics and International Trade and clean materials and process improvements that impact Aerospace and Information Technology.

Industry Needs for Continued Innovation and Growth

Access to foreign suppliers for both raw materials and products is critical. For example, most biofuels in the region are manufactured using palm oil from Southeast Asia, while virtually all wind generators are manufactured in Europe. To become truly competitive in this field, local and regional sources should be developed.

As in the Life Sciences sector, the need to increase the availability of start-up capital is an ongoing challenge. To address this need, a group of investors have come together as the "energy angels" to invest in alternative energy efforts. This, coupled with the state's incentives for biofuels development, has led to a boom in this industry over the past year. This narrow focus must be broadened, however, to include the wide range of products, processes and services being developed to increase energy efficiency and streamline manufacturing.

There are several research and support organizations that service this cluster: The Washington Technology Center, the Northwest Energy Technology Collaborative, and Pacific Northwest National Laboratory. Closer relationships between these groups and the cluster will be imperative, particularly with the challenge of commercialization. A good model is the US Environmental Protection Agency's Environmental Technology Verification program, which provides third-party assurances to the market.

Workforce Needs

The rapidly growing demand for skilled labor and skilled trades (such as electricians and plumbers) is driving wages up and creating construction bottlenecks. An adequate supply of building trades workers, trained in energy and water supply retrofits as well as the principles of green building, is

critical to continued success in this field. In addition, most companies need well-trained college graduates with strong math, science and engineering skills.

Prosperity Partnership Clean Technology Cluster Action Initiatives

- Determine the need for and feasibility of creating a Clean Technology advocacy organization
- Increase Clean Technology demonstration projects

LOGISTICS & INTERNATIONAL TRADE

Industry Overview, Trajectory, and Needs⁹

Logistics and International Trade is a mature cluster that employed over 42,000 people in 2001. The cluster is composed of Air, Rail, Sea and Truck Transport, Support Activities for Transportation, Warehousing and Trade Finance. Given the historic importance of the various ports in the region's economy it is not surprising that the Sea Transport industry is the most concentrated in the region, with an employment concentration ratio of 3.6. The Port of Seattle is the fifth-largest container port in the nation and Sea Transport industries have a high employment concentration in the Puget Sound and contribute about 12% of total sales in the cluster. Air Transport encompasses Sea-Tac airport and is the largest sub-cluster within the industry, employing over 18,000 in 2001. Almost 50% of the activity generated by the cluster was in Air Transport industries, which is the only set of industries in the cluster with above-average dynamism. The Truck Transport and Support Activities industries are also large employers in the cluster. This section provides an overview and industry outlook for the major subsectors of this cluster—Air, Rail, Truck and Sea Transport, and Warehousing.

Air Transportation

The industry is undergoing structural change, which is being smoothed out somewhat by federal help and the cyclical upswing in the overall economy. Cost-cutting and rising airfares are helping bottom lines, along with federal help through finances, loan guarantees, and leniency with pension rules. As the economy improves and business travel rebounds, at least some legacy airlines should see a return to profitability. But there are still significant structural problems, including minimal revenue in 2003-04, labor unhappiness, low productivity, huge fixed costs, and customers who use the Internet to find cheaper fares. Airlines may have to adjust to a lower-margin reality by incorporating the new low-cost, high-efficiency business model.

High fixed costs still hamper traditional airlines. Many of them are operating with breakeven load factors upwards of 90%. With the evaporation of demand for unrestricted fares and the integration of the business and leisure markets, airlines are struggling to find revenue to cover the significant investments and labor commitments made in the 1990s. Meanwhile, well-capitalized, low-cost airlines are simply offering a better product for less money.

The air cargo market remains a bright spot, more for its stability than because of large increases. Cargo revenue miles should improve as an economic rebound sparks corporate spending. Cargo carriers do

⁹ The bulk of this Logistics and International Trade Overview and Needs section was drawn directly from the Prosperity Partnership *Volume II of the Regional Economic Strategy* document adopted in September 2005.

face increased costs and logistical problems from security as fears of terrorist activity shift because of enhanced security already imposed on the passenger fleet.

Demand for airlines and airfreight should continue to improve over the coming three years. The downturn in revenue passenger miles (RPM) since the September 11 attacks was catastrophic, not only because of the severity, but because it followed 10 straight years of steady growth. RPMs fell 31% in September 2001 and domestic RPMs fell 33%. The recovery has been uneven, with an initial rally curtailed by fears of the war in Iraq and SARS. These fears are receding, and travel activity has improved markedly since mid-2003.

Luckily, rebounds in the U.S. and global economies are coming to the rescue just in time. During the recession, corporate travel budgets were cut sharply. The economy is now rebounding, along with corporate profits. Thus, business travel will undergo cyclical expansion through 2006. But three years of curtailed travel have taught many companies how to conduct business without traveling. This has created a structural change, and airlines will have to contend not only with the reluctance to pay full, unrestricted fares, but also with competition from teleconferencing and Web hosting. It is not likely that unrestricted fares will again reach the huge premiums fetched in the late 1990s.

The picture for the air-cargo business has been improving as well, partly due to growing exports from China. Cargo traffic in Shanghai was up 36.8% in the first four months of 2004 over the same period in 2003, the top gainer among the world's top 30 cargo airports. Each of the top 30 airports had positive growth in traffic in 2004, a sign of increased economic activity. Mail traffic is still down 50% from its 2000 highs. Mail may be in secular decline due to the popularity of email and fax. More stringent security measures could hamper speed of delivery and increase costs, marginally decreasing the attractiveness of shipping by air.

Rail Transport

Rail traffic has increased steadily over the past few years and is expected to continue growth on the traffic front as the economic recovery continues. After increasing 4.5% in 2004, we expect growth in rail ton-miles to average about 3.0% per year in 2005-06.

The demand for new rail equipment has turned the corner in a big way, and rail-car builders are reporting their largest order backlog since the first quarter of 1999. Solid traffic growth and pressure to replace older/smaller units in the fleet will keep the demand for new equipment at lofty levels. Component and plate steel shortages have curtailed new car production, but that situation is beginning to ease.

Looking ahead, freight car demand will continue to gain ground, propelled forward by a favorable economic environment, solid growth in rail traffic, and the ability and willingness of car owners to replace the older, smaller, and inefficient units in their fleets with state-of-the art equipment.

Truck Transport

Major for-hire carriers have benefited from the economic recovery, gaining share from the smaller carriers in the industry, and drawing traffic from companies that no longer want to handle their transportation needs themselves. Volume gains among "big trucking" could reach 6.5–7.0% in 2004, and 4.0–5.0% over the next two years.

Sky-high diesel fuel prices have not been good for anyone in the trucking business, but major carriers have been able to soften the blow with fuel surcharges. Diesel fuel prices will eventually come down as crude oil prices decline. The driver shortage has emerged as a much more serious problem for trucking companies.

Major trucking companies have reaped the benefits of an expanding economy, market-share gains against the weaker players in the for-hire carrier segment, and the trend among private carriers to outsource their transportation needs. Given expectations for the future performance of manufacturing, foreign trade, construction, and agriculture, the Prosperity Partnership expects volume growth among major trucking companies of 6.5–7.0% in 2004, 5% in 2005, and 4% in 2006.

Water Transportation

Deep-sea freight transportation continues to experience the strongest growth in activity, causing strong upward pressure on prices. Between 1999 and 2003, deep-sea freight rates surged by 88%. Very strong demand for vessels transporting commodities to China and declining capacity pushed up rates to record levels in October 2003. As long as traffic volumes remain strong and fuel costs high, there is little reason to expect any big movement on the pricing front. Additional capacity would help shippers with rates.

Looking ahead, an expanding economy will be reflected in energy demand and movements of crude oil and petroleum products. High oil and natural gas prices have made coal more attractive as a fuel source than in recent years, but growth in production and demand will slow considerably after this year. A revitalized steel industry and the anticipated cyclical recoveries in nonresidential and public construction are expected to support growth in production of these commodities through the end of 2006. Waterborne commerce will almost certainly benefit from growth in the traditional industrial sector.

Warehousing and Storage

Over the past decade, Warehousing and Storage has grown faster than the overall economy. The trend among retailers and manufacturers to limit their inventory exposure by having someone else hold the inventory and the trend among private fleets to turn their transportation needs over to professional logistics companies played no small role in the increase in output in the Warehouse and Storage industry. The strong growth in Warehousing and Storage also reflects the need to establish distribution facilities to handle the crush of manufactured goods imports. Finally, regional growth trends and population shifts required that distribution centers be set up closer to the buying public.

Warehousing is likely to continue to increase with these recent trends in limiting inventory exposure to consumers, but at a slow, steady rate. Because the Puget Sound region is the main population hub of the Pacific Northwest, distribution centers are projected to increase, especially with the rise in electronic shopping with sites such as Amazon.com.

Prosperity Partnership Logistics & International Trade Cluster Action Initiatives

- Communicate a jointly developed Logistics and International Trade message
- Develop a small business and entrepreneurial support network
- Enhance freight mobility through securing sustained funding and developing transportation chokepoint solutions
- Create a domestic logistics mission
- Attract Foreign Domestic Investment
- Stage an export promotion symposium and classes for small and medium-sized businesses
- Link with the Seattle 2010 action plan, which leverages regional opportunities during the 2010 Winter Olympic Games in Vancouver, BC

5.0 STRATEGIES TO MEET LABOR SUPPLY AND SKILLS NEEDS

Original Question

What specific resources would be needed to facilitate innovation within the Zone? What are the potential labor supply and skill demands to promote these changes? How can an industry of firm be supported to develop next generation technologies or work processes and promote high skills?

5.1 Overview and Approach

This chapter responds to the State's questions about workforce resources and skills needed to support Innovation Zones. The chapter summarizes a mix of Working Group discussions and existing reports containing strategies and opportunities to provide workforce training needed by some of the industries in the Zones. In particular, the chapter responds to the State's request to highlight strategies and resources that would enable Innovation Zones to create opportunities for individuals who face barriers to employment, such as youth, dislocated workers, incumbent workers, and low-income adults

5.2 Education and Training Strategies

The Working Group brainstormed a wide range of education and training strategies to address labor supply and skills needs in the Innovation Zones. The following list of ideas is not an exhaustive list but does provide examples of strategies that can be applied at all levels of education, from K-12 to higher education.

K-12 Strategies

- **High school preparatory programs that focus on careers in technology fields and math and science.** An excellent example of this type of program is the Machining Pathways program at Snohomish High School. The program is a computer-based, high-tech machining, programming and engineering design course for students who are able to work in labs filled with advanced equipment donated by corporate sponsors.
- **High schools with industry-specific curricula.** There are several types of programs that structure curricula around an industry or career path. Aviation High School at Boeing Field is example of a school in the Puget Sound region that focuses on skills and careers in aviation. The school's curriculum fulfills all standard high school requirements but all of the subjects revolve around an aviation theme, emphasizing math, science and technology. In addition to credentialed teaching staff, leaders in local aviation are instructors and mentors at the school.

Career academies are another type of program that often deals with at-risk youth. A career academy creates a small learning community with a core team of teachers using a particular career as a theme for the curriculum. Career academies are usually formed with funding from the public and private sector, have an advisory board from the private sector, and have dedicated internships and mentors associated with academy.

- **Extracurricular programs that promote learning in science, math, and engineering.** There are many examples of programs that encourage learning in math and science outside of the classroom. Listed below are few examples.
 - The FIRST (For Inspiration and Recognition of Science and Technology) LEGO League (FLL) inspires future scientists and engineers. Guided by imagination and adult mentors, FLL students, 9-14, face real world engineering challenges, discover career possibilities and learn to make positive contributions to society. FLL is a result of a partnership between First and the LEGO Group.
 - The FIRST Robotics Competition (FRC) combines the excitement of sport with science and technology to create a unique varsity sport for the mind. FRC helps high school students discover the rewarding and engaging process of innovation and engineering.
 - A World In Motion makes the challenges of math and science exciting by bringing authentic engineering design experiences into the classroom.
 - The Washington Aerospace Scholars Program. This program for high school students offers exciting opportunities in math, engineering, physics and chemistry and give students the opportunity to participate in hands-on engineering activities, tour industry facilities, receive mentoring from astronauts, pilots, engineers and scientists and conduct a project on Mars exploration. incumbent worker training

Community Colleges and Continuing Education Strategies

- **Funding and support for incumbent worker training.** Due to changing workforce and skill needs in dynamic industries, there is high demand for incumbent worker training throughout the region. The State should support incumbent worker training programs and programs that leverage the knowledge and expertise of private industry to provide this training. Evening and weekend classes and distance learning programs are good venues for incumbent worker training.
- **Industry-specific Training Centers.** Several Innovation Zone industries would benefit from training centers tailored to specific high-demand skill sets. A good example of this type of training facility is the new Employment Resource Center located next to Paine Field in Snohomish County. The Center, which recently opened for its first class, is a 40,000 sf state-funded facility that will house aerospace training programs. For the first five years Boeing and its contractors have exclusive use of the Center to train workers on how to build the new Boeing 787 jet; then the Center will become a general aerospace training facility.
- **Training facilities and resources in Innovation Zones.** Where appropriate, training facilities or workforce resource centers can be located in Innovation Zones, like the Paine Field Employment Resource Center.
- **Adjusting community college funding mechanisms.** The State should explore changes to the way community colleges are currently funded to allow more flexibility in customizing and changing curricula. This will allow community colleges to tailor curricula and training programs to be more responsive to local industry needs.

Higher Education Strategies

- **Creative certificate programs.** Some high-demand workforce skills can be gained through focused technical training certificates that can be completed in 2-3 years rather than a full four year degree. Development of more focused certificate programs will help the State education system produce more skilled workers and meet industry workforce demands.
- **Prosperity Partnership Higher Education Working Group strategies.** The Prosperity Partnership higher education working group has developed a set of draft recommendations to increase production of bachelor's degrees in high-demand, high-impact fields. These recommendations include: funding additional capacity for high-demand degrees; using outcomes-based management (paying for degrees, not years of instruction); funding FTEs at institutions for high-demand degrees; committing a percentage of the general fund to higher education; and studying capital needs.
- **Co-location of public research facilities and private sector facilities.** The State can spark public-private collaboration and dynamism by encouraging the strategic location of new public research facilities in existing or emerging Innovation Zones. For example, University of Washington research facilities located in and near South Lake Union will help promote innovation and partnerships with private industry and increase the vibrancy of the Life Sciences Innovation Zone proposed for this area.

5.3 Workforce Development Action Strategies

The State of Washington's 2004 report, *High Skills, High Wages*, contains 15 strategies where the State's workforce development councils can take a leadership role. A number of these strategies pertain to Innovation Zone development. Summarized below are relevant implementation strategies from the Seattle-King County WDC's 2005-08 Strategic Plan, which serve as an example of how workforce development and training actions can support the Puget Sound's Innovation Zones.

1. **Strategy 1.1.1**—Create and enhance industry skill panels, especially in high-demand economic clusters such as health care and IT.

For Information Technology: The WDC will take on a strong partner role with representatives of industry, education, and community based organizations. Implementation strategies include developing cutting edge service delivery models for youth; exposing youth to alternative Information Technology "plus" careers; and exploration of the possibility of designing a state of the art IT career center.

For Biotechnology/Life Sciences: In 2004, the WDC became a member of the Washington Biotechnology and Biomedical Association and also established relationships with several research and educational institutions that conduct life sciences programs. Through its life sciences skill panel work, the WDC will pursue the following initiatives:

- Explore the possibilities of providing youth with the necessary prerequisite training, mentorship, and internship opportunities in the science and biotech industry; and

- Provide certificate and upgrade training for new and incumbent workers, as well as teachers, that will grow skills and provide a pool of experienced and well-trained employees in the Puget Sound area.
2. **Strategy 1.2.1**—Develop individual career plans that are integrated with a range of school programs to ensure all youth are aware of the link between learning and employment and their career options, including high-wage, high-demand occupations, and nontraditional occupations.
 3. **Strategy 1.2.2**—Expand partnerships with industries to market their career opportunities to youth and their parents.
As an example of such partnerships, in the Information Technology sector the Digital Bridge Academy program provides basic hardware and software training to more than 100 out-of-school youth. Between 10-15% of the youth will be placed in internships with local employers, and local youth providers are working to expand information-technology industry partnerships to make such work-based learning opportunities available for more youth.
 4. **Strategy 3.2.3**—Expand access to support services, such as child care, especially for target populations.
The WDC and partners continue to search for available community resources. Connection Teams located at each of the eight WorkSource sites have referral information available on local resources. Recently a connection was made providing access to transportation for low income job seekers through a grant received by FlexCar.

5.4 Industry-Specific Workforce Needs

AEROSPACE

Recommendations to Address Workforce Needs in Aerospace¹⁰

Support the Advanced Materials Manufacturing Innovation Center (AMMIC). Help develop the AMMIC and the Employment Resource Center (ERC) to serve the Puget Sound, Washington State and the nation in providing the research and educational/training linkages to current and future aerospace advanced materials and manufacturing processes.

Improve Training Programs. Provide resources for the improvement of training program infrastructure such as curriculum development, facilities, personnel and equipment. Support customization of training programs for specific industries (e.g., Job Skills Program grants, customized training tax credits, and WIA customized training dollars).

Improve Access to Training Programs. Provide resources to assist individuals in accessing training and educational programs through scholarships, WIA career advancement accounts, WIA individual training accounts, worker retraining assistance and industry employee education and training support.

¹⁰ Specific Aerospace workforce recommendations drawn from the *Aerospace Washington State: Vision for the Future* document drafted by the AFA (Aerospace Futures Alliance) and the EDC of Snohomish County.

Market the State's Aerospace Workforce. Develop marketing materials that clearly demonstrate the productivity and efficiency of today's workforce. Develop a summary of the Lean education and training initiatives in existence today; identify best practices; quantify the number of employees/hours of training provided in such training programs; and using sample information provided by local aerospace suppliers describe potential benefits of locating in Washington.

LIFE SCIENCES

Recommendations to Address Workforce Needs in the Life Sciences

Several groups are currently working to identify strategies and initiatives needed to facilitate growth in the State's life sciences sector, including workforce strategies. In particular, the Washington State Life Sciences Skill Panel (funded through the Washington State Workforce Board), and the WBBA's Workforce, Education, and Communications working group, have been working to craft recommendations that address workforce needs in the life sciences. The two groups, comprised of industry, education, community based organizations, workforce, and economic development leaders, were convened in 2005-06, and collaborated on major issues and their solutions. The group's major recommendations are excerpted and summarized below. Some of these recommendations may not include a direct role for the State but they provide examples of the types of strategies the State can implement to address workforce needs in the life sciences.

Create a Life Sciences Comprehensive Communication Plan. The economic, personal and cultural potential of the Washington state life sciences industry is largely unknown both within and outside the State. A comprehensive strategy will enable the State to pool resources, minimize duplicative efforts, and strengthen key messages, thereby reaching a broader audience.

Publish Labor Market Data on High Demand Life Sciences Careers and Career Paths in Washington State. The variety of careers in life sciences continues to evolve and expand in our State. While there is some data that highlights careers in biotechnology, information regarding job growth in high demand careers such as clinical research associate and bioinformatics specialists is not available. It is also unclear how individuals move up career ladders in this industry. In order to serve businesses more effectively, workforce and education institutions require solid labor market data to provide training and curriculum that is up-to-date and meets the needs of industry and fill high demand job vacancies. This information will be published and shared on Washington Science Central's website, economic development and workforce development sites, and through the Washington Science Teachers Association and various public and private publications.

Develop and disseminate career path information (career path template) to science teachers, high school counselors, and K -12 students. This information will be released initially in December 2006, with efforts led by the Snohomish County Workforce Development Council.

Launch the Life Sciences Industry Education Council. As an outcome of the Washington State Life Sciences Skill Panel, the Industry Education Council is in the process of establishing its mission and objectives. The Council's purpose is to address critical workforce training and education issues through a WBBA-hosted forum for senior leaders from industry and education. The Council will meet on a quarterly basis and will be comprised of about 35 senior industry managers, workforce and economic development leaders, college/university deans, and school district leaders. Potential

objectives of the Council will consider include: strengthening the pipeline of people interested in life sciences careers; working with industry to identify targeted curriculum and training development programs; working with post secondary and secondary institutions on curriculum changes and certificate programs; raising public awareness and industry support for innovative K-12 life sciences programs; strengthening and expanding student involvement in programs that increase exposure to job opportunities and hands-on experience; identification of potential funding to support innovative science education and outreach projects; creation of educational and workforce strategies for entry into the life sciences for disadvantaged learners; and provision of support to and integration with Washington Learns, Navigation 101, and the Prosperity Partnership Higher Education Working Group.

Create “Washington Science Central,” an on-line database and tool for job seekers, hiring managers, and educators. Washington lacks a central resource or clearinghouse for current education and career resources in the life sciences. The State offers innovative science programs and provides a broad range of careers that most citizens, even our own science educators and hiring managers are unfamiliar with. This site will serve both as the repository for easily accessed audience specific information, and a rich bank of sector related links. The first phase of the website will be launched in September 2006, with further funding sought for design, implementation, and data costs.

6.0 PUBLIC POLICY RECOMMENDATIONS TO PROMOTE GROWTH AND ECONOMIC VITALITY IN THE INNOVATION ZONES

Original Question

What policy changes in state or local investments or industry supports could be redirected or expanded to promote the success of the Innovation Zone.

6.1 Tax Strategies

Tax strategies represent a significant opportunity for the State to provide public policy support for Innovation Zones and the industries within them. A recent, successful example of such support is the 2006 passage of Senate Bill 6326, sponsored by Senator Shin and others, which recognized the importance of workforce training as an economic development tool.

SB 6326 Overview. The legislation, which sunsets in 2012, provides new funding for customized workforce development needs. Following recommendations of the Washington Competitiveness Council to accelerate worker training in high-demand fields for new workers, incumbent workers and displaced workers, the law creates a new loan fund, the Employment Training Finance Account, to be administered by the State Board for Community and Technical Colleges to administer a new program that awards training allowances to employers that have entered into training agreements with colleges in the State (preference is given to employers with fewer than 50 employees). The legislation also comes with several restrictions and requirements: at the completion of training, employers are required to pay one-quarter of the cost of the training into the Account, and the additional three-quarters of the training cost is required to be repaid within 18 months. A B&O tax credit is provided to employers for half the amount that is paid into the Account, and employers are required to show that their employment in the State has increased by at least 75% of the trainees in the training program.

Recommendation. The Working Group supports this program and recommends that it be expanded, with the caveat that its restrictions be revisited and reduced, to decrease its administrative complexity, and increase its workability and likelihood of use.

Other Tax Strategy Recommendations. The group makes the following additional recommendations:

- Maintain the R&D exemption on B&O tax payments.
- Support passage in the 2007 Legislature of an apprentice employment incentive package to encourage Washington State employers to employ students in math and science programs. This legislation would benefit several Innovation Zone industries.
- Look for opportunities to improve the business tax structure that can sometimes punish start-up companies needing to invest profit.
- In developing legislation to support industries, consider Return on Investment (ROI) as an appropriate measure for investment decisions. This approach, based on a benefit assessment to the State, would be a broader and more balanced approach than simply looking at tax incentives as a "cost" to the State.

6.2 Investment and Regulatory Strategies

- **Focused State investments for workforce training or transportation funding for Innovation Zones.** Appropriating a percentage of funding to support the needs within Innovation Zones would make the Zones more attractive to industries considering investment, and would help propel growth in those areas.
- **Permitting and regulatory streamlining at the local government level.** At the individual jurisdiction level, there may be opportunities to reduce or mitigate regulatory barriers to expansion of primary industries in the Zones.

6.3 Strategies to Address Technology Commercialization and Access to Capital

- **Pairing researchers and inventors with entrepreneurs or business centers.** This concept is similar to the Washington Technology Center's Research and Technology Development (RTD) Grant program that issues grants to academic institutions to pair up with inventors to do "applied research" and develop a marketable product.
- **Targeted grants for small innovative firms in Innovation Zones.** The Small Business Innovative Research (SBIR) program is a good example of this strategy. The SBIR program offers an opportunity for Washington companies to find investment from federal sources to assist with growth of their companies. This program is specifically targeted to small to mid-size businesses with limited capital looking to introduce innovative technologies into the global market.
- **Provide technical assistance for grant applications.** The State of Washington has the opportunity to increase its share of SBIR and similar grants awards by providing technical and grant application assistance to interested businesses in Innovation Zones.

Another example of a grant assistance program is the Procurement Technical Assistance Center in Snohomish County. The Center provides technical assistance on complicated procurement applications.

- **Support industry-university research consortia.** Collaborations between businesses and research institutions have great potential to develop new and innovative processes and products. Examples of these consortia include the Center for Design of Analog-Digital Integrated Circuits and the Center for Excellence in Semiconductor Research at Washington State University.
- **Washington State Ethics in Public Service Law.** If appropriate, explore opportunities to improve the Washington State Ethics in Public Service Law to allow for better commercialization of innovations developed at public research institutions.
- **Provide or encourage more "Angel" investments.** Many startups have received valuable early-stage capital and support from so-called angel investors. These investors tend to be knowledgeable in high-tech fields, willing to take risks for ideas they have confidence in, able to provide business management expertise, and confidence in scientists they know and have reason to support. This type of investment should be encouraged and supported.

- **Support networks of investors, entrepreneurs, and businesses.** Formal and informal programs that bring together angel investors, innovators, and businesses strengthen the public-private networks that foster technology commercialization. The State should sponsor or support these networking activities to increase early-stage capital and technology commercialization in the region.

6.4 Industry-Specific Public Policy Recommendations

AEROSPACE¹¹

The following recommendations are excerpted from the *Aerospace Washington State: Vision for the Future* plan:

Support passage of an extension to the Aerospace Tax Incentives Package in the 2007 legislative session (SB4406 and HB2466 – measures that did not pass in the 2006 session).

While the 2006 Legislative sessions extended two of the aerospace tax incentives initially provided in the 2003 session and created an additional incentive element, it still excludes an even broader range of direct support functions including those engaged in pure engineering but not manufacturing, tooling, ground support equipment, maintenance, repair and overhaul, and general aviation aircraft.

Other specific recommendations to support the Aerospace industry are:

- **Extend Aerospace incentive programs.** Identify the fiscal impact of extending the five tax incentives listed in Exhibit 12 to the balance of the Aerospace industry.
- **B&O tax credits for apprentice programs.** Provide a B&O tax credits for employers employing student employees in apprentice programs that enrolled in qualified technical programs at Washington institutions of higher education (students learn and receive classroom credit plus salary which is credited against employers B&O tax)
- **Support efforts to develop an Aerospace Suppliers Strategy.** Due to the increased competition for aerospace suppliers, the development of an Aerospace Suppliers Strategy should be supported. There is a need to approach suppliers and market the advantages of locating near the main production plants in Washington.

¹¹ Specific Aerospace workforce recommendations drawn from the *Aerospace Washington State: Vision for the Future* document drafted by the AFA (Aerospace Futures Alliance) and the EDC of Snohomish County.

Exhibit 12
Aerospace Tax Incentives and Year Passed for Various Operations

Tax Incentive Element	Airframe Manufacture	Component Manufacture	Develop, Design and Engineer but not Manufacture	Tooling	GSE	MR&O (FAR 145 Repair Station)	General Aviation
Reduced B&O tax rate	2003	2003				2006	
Sales and use tax exemptions for certain computer equipment	2003	2003	2006				
B&O tax credit for pre-production development spending	2003	2003	2006				
B&O tax credit for property taxes paid on certain types of property used in manufacturing	2003	2003					
B&O tax credit for leasehold excise tax paid	2006	2006				2006	

Source: Aerospace Washington State Vision for the Future, 2006

LIFE SCIENCES

The draft version of *WBBA's 2006 Life Science Report* identifies a range of industry-specific public policy recommendations needed to promote growth and development of the State's Life Science industry. The report is still in draft format and subject to change so only general categories of recommendations have been included in this section. Specific recommendations will be finalized in and released with the final *2006 Life Science Report* in October.

Research Investments

Strengthen the Research Infrastructure. Research depends heavily on a solid infrastructure of specialized physical facilities, scientific equipment, powerful computing resources and general operating support. Recommendations in this category will focus on increased investment in equipment, instrumentation, and data connections as well as the promotion of public-private facility co-location.

Facilitate Recruitment and Retention of Outstanding Researchers. Top researchers and high-quality graduate students and postdoctoral fellows are essential to the success of research programs. Recommendations in this category will focus on funding for research programs, positions, and research focus areas.

Support High-Risk Research Projects. State funding for cutting-edge, high-risk research is needed to stimulate innovation. Recommendations in this category will focus on mechanisms to encourage support for high-risk applied research projects with the potential for significant innovation.

Encourage Research Institution-Industry Interactions. Strategic alliances between research institutions and industry are becoming more important as industry increases its reliance on alliances with universities and other research institutions to fill the demand for innovation. Recommendations in this category will focus on enhancing support to technology and innovation development programs, increasing technology transfer and innovation grant funds, and providing additional funding for technology gap programs at research institutions.

Business Climate

Adjust State Tax Structure. Recommendations in this category will focus on implementing tax incentives to encourage life sciences companies to locate in Washington State and restructuring the current tax system to be more competitive and equitable.

Improve Governmental Communications. Recommendations in this category will focus on improving communication of life science industry needs and economic contributions at the State government level and encouraging consistency and fairness in regulatory codes at the local government level.

Analyze Life Sciences Manufacturing. Recommendations in this category focus on analyzing Washington's current and potential attractiveness as a life sciences manufacturing region, and, if potential exists, to recommend ways to improve competitiveness and increase manufacturing activity.

CLEAN TECHNOLOGY

Tax incentives can be real drivers in the Clean Technology cluster and there is opportunity for the State to guide Clean Technology industry growth through tax incentives. An example is the biodiesel industry, which is currently being driven by strong tax incentives. Because biodiesel companies are now importing feedstock from as far away as Malaysia, the State should look into providing incentives to promote the use of feedstock and other Clean Technology inputs from Washington instead.

State grants can also be very helpful to emerging industries like Clean Technology. For example, there is an Ohio public-private organization called JumpStart that offers grants to startup companies that do not have to be paid back if the company brings the product to commercialization. This type of targeted grant program could alleviate many early-stage capital and technology commercialization issues that hinder young industries and startups.

In addition, the recommendations cited for the life sciences sector would also benefit the Clean Technology sector. In particular, commercialization and market development assistance, greater industry-research institute collaboration, and funding for high-risk demonstration projects would be most beneficial.

ATTACHMENT A – PROSPERITY PARTNERSHIP ECONOMIC FOUNDATIONS OF THE ECONOMY

The Prosperity Partnership report identified six “economic foundations” underpinning the region’s economy. Several of these elements are directly related to the needs of the Innovation Zones.

Human Resources — The region’s workforce is highly educated and the workforce development system seems to be working well; however, skill gaps remain between the workforce and the needs of key clusters.

Technology — While there are enormous resources for research and development and other sources of innovation, the system of “technology commercialization” in the region has weaknesses that result in fewer businesses being launched on the back of new technologies than should be the case.

Access to Capital — The region is relatively “under-banked” in the sense that its employment in industries such as commercial banking is significantly below the national average; the availability of early-stage venture capital has been particularly scarce ever since the burst of the tech bubble in 2001; the region shows strength in Small Business Administration (SBA)-backed small business lending per employee, though firms in the region tend to be smaller, on average, than those in peer regions.

Public Infrastructure — While the region hosts top-notch air and sea transportation systems, there is some overlap in shipping and container capacity, highway congestion continues to be a significant problem, and there is not enough mass transit.

Business Climate — While the region ranks highly in the rate of new business formation, it ranks very low in its ability to assist and retain small businesses; the Business & Occupation (B&O) tax is particularly onerous for start-up businesses; entrepreneurial support networks are also weaker than in peer regions.

Quality of Life & Social Capital — The region is home to the largest private philanthropic foundation in the world as well as a sophisticated network of non-profit institutions; its residents give generously to art, open space and other efforts to preserve our physical and cultural environments, creating a commitment to community that is exceptionally high when compared to other regions.